POWER

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ELY C. HUTCHINSON, *Editor*

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Operator's Education

When a contract is taken for oil and steam power machinery it is not unusual for the seller to include in the price the services of a construction superintendent to take charge of the machinery installation and stay with the buyer's men for a specified period and instruct them in the operation of the equipment.

This is a splendid plan that benefits and protects the interests of buyer and seller alike. But like many another it is subject to abuse.

Sometimes, with the feeling that if one construction and operating man is good, the buyer reasons that three such men will be of triple benefit. Generally, too, he feels that the seller can be persuaded to furnish three such men without added cost if it is made to appear that the placing of the contract hinges upon this final detail.

If the seller "falls" it usually means that his three men will hold the head operating jobs and leave no one of equal competence behind when their work is finished. So, in the last analysis, the plan frequently fails of its purpose and succeeds only in increasing the seller's expense to no useful end.

One construction superintendent is certainly all that is necessary to oversee the details of installation.

During the operating period if three head men are needed, how much better it would be for the buyer to detail two good men as understudies to receive instruction from the seller's representative. He can then teach them everything and on departure will leave with the knowledge that the equipment is permanently in skilled hands, competent in turn to instruct others.

To the buyer this safeguard means assurance of continuous and efficient operation. To the seller it means protection of the equipment for which he is responsible and a saving of expense which has detracted nothing from the benefits of the system.

Another Year

THIS, the fourth annual equipment review, discloses numerous new designs and variations of accomplishment for the good of the power field. There is evidence of commendable ingenuity and a sensitive regard for the purchaser's needs in many ways.

Those who have not tried it need only look at the results being achieved by the companies which have recognized the changed order of business and the life-giving importance of research, both scientific and practical, to see that they must change their methods or go to the foot of the class.

All of which emphasizes the fact that not for many years has there been such opportunity as the present for manufacturers to devote time and brain to the perfection of their carefully stored up ideas, new designs, and plans.

Some engineers have been heard to say that present equipment is so near perfection there is little to be gained by further effort and the "sport is not worth the candle." But these same words have been disproved so often they are discountenanced.

The same view holds good for the users of power equipment, for obviously they too must keep their eyes open and be ever ready to take advantage of operating methods, equipment, and apparatus which enable them to reduce the cost of the kilowatt-hours or the steam service they are generating. It cannot be forgotten that the builder of the steam plant of yesterday is tomorrow in competition with the builder of the new and strictly modern plant in which every advantage is taken of improved methods and machinery.

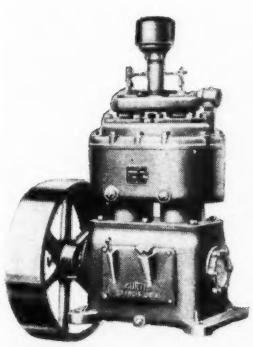
For the older plants then the watchword is "modernize," and this number of *Power* is especially built as a means for bringing engineers and prospective users into touch with the improvements of the year, so they may better judge their positions in their own fields. If it does this it will have served a genuinely constructive purpose.

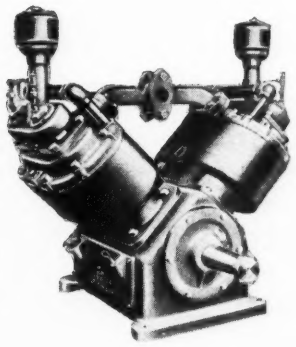
POWER Stands for . .

1. Making Power When It Should Be Made
2. Buying Power When It Should Be Bought
3. Cheaper Power Through Modern Equipment
4. Easier Financing of Equipment Purchases
5. Better Use of Byproduct Heat and Power
6. Operating Methods That Save Money
7. Less Waste in Transmission and Application
8. Prevention of Smoke, Within Reason

Air Compressors, Filters and Accessories

Introduction of the supercharger principle, giving increased efficiency, and the combining of the low-pressure cylinder head, high-pressure cylinder and intercooler of a two-stage unit in a single casting are innovations in air compressor design





Two- and Four-Cylinder Air Compressors

Seven models, five of the two-cylinder type ranging in size from 4¼x3¾ to 6½x5, with a displacement of 25 cu.ft. to 125 cu.ft., and two of the four-cylinder type, a 5½x5¼ and a 6½x5¼ size, with a displacement of 115 cu.ft. to 262 cu.ft., comprise the line of Curtiss Model C industrial compressors. They are available for belt drive from a lineshaft, separate motor, steam engine or other prime mover.

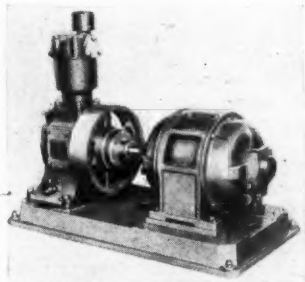
The valves are of the light disk type, of rust-resisting metal with large non-obstructed ports, and are said to be carbon-free. The crankshaft is mounted on roller bearings, and the oiling is provided for by the "Centro-ring" oiling method. A large-diameter ring operating at slow peripheral speed carries oil to the crankshaft midway between the bearings, from where it is delivered by centrifugal force through large oil ducts to each throw. The large steel ring is the only moving part of the oiling system.

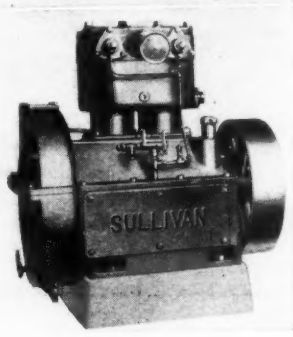
Curtis Pneumatic Machinery Company, St. Louis, Mo. Jan. 12, 1932, page 75.

Ball-Bearing Vertical Air Compressors

Among the units comprising this line are type WL-1 for flat and V-belt drives and type WL-11 direct-motor driven compressors. They are single-cylinder, single-acting units with heavy-duty ball bearings on the crankshaft. They provide displacement ranges from 27 to 67 cu.ft. per minute for pressures up to 125 pounds.

Direct-connected units employ flexible gear-type couplings between the compressor flywheel and the motor shaft. "Sweep control" unloading system is employed, but automatic regulation of several types, including manual, semi-automatic, fully automatic start and stop control for both the belt and direct-connected units, can be furnished.





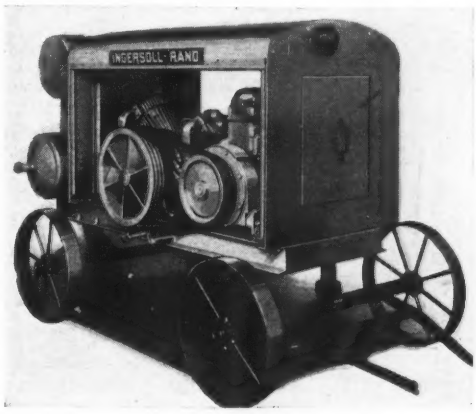
The WL-2 and WL-4 belt-driven vertical units are available in two-cylinder and four-cylinder models, respectively, and are similar to the direct-connected units previously available. Capacities range from 119 to 348 cu.ft. free air per minute. The four-cylinder units are "V" type balanced design.

Sullivan Machinery Company, 400 North Michigan Ave., Chicago, Ill. Dec. 22, page 912.

Small Portable Air Compressor

Portable air compressor, Type 30, with a capacity of 30 cu.ft. per minute is a standard I-R two-stage, air-cooled, ball-bearing unit equipped with plate valves, fan-type pulley sheave and finned copper tube intercooler. It is driven by a Fuller-Johnson four-cylinder four-stroke-cycle ball-bearing engine through a V-belt. The unit is equipped with air cleaners, automatic unloader and governor, and a 16x40-in. air receiver and a 12-gal gasoline tank are mounted on the frame at the rear.

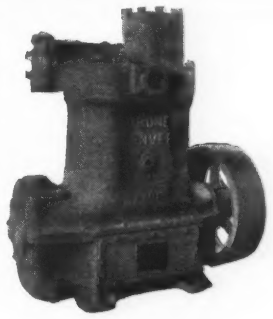
Ingersoll-Rand Company, 11 Broadway, New York City. June 2, page 897.



Two-Stage Compressor for Pressures to 1,000 Lb.

This unit is made in capacities from 24 to 90 cu.ft. of free air per minute and is for pressures up to 1,000 lb. A feature of the design is the combining of the low-pressure cylinder head, high-pressure cylinder and intercooler in a single casting. Through the use of large cored passages in the cylinder block and head, all outside air and water piping between the cylinders and to the intercooler has been eliminated. Instead of the low-pressure air passing through tubes surrounded by water, the water passes through the tubes, which are expanded into steel header plates, so that the entire nest of tubes can be pulled out as a unit. Lubrication is by the force-feed system. Oil under pressure is pumped to each main bearing and crank pin as in automotive practice.

Gardner-Denver Company, Quincy, Ill. Dec. 22, page 912.

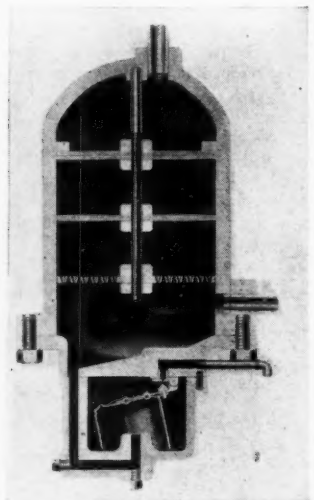


Oil-Type Air Cleaner

When used on compressors and other internal combustion engine-driven equipment, part of the exhaust gases are used in this filter to create an oil spray for washing the air. The exhaust gases enter the bottom compartment of the filter and set up a turbulence in the oil, causing the washing chamber immediately above the oil level to be filled with a spray of finely

divided particles. Outside air entering this chamber must pass through the spray and be deflected by two specially shaped baffles. The combined action of the oil spray and series of baffles washes the air thoroughly, and the baffles deflect the dust particles down the sides of the chamber into the reservoir.

United Air Cleaner Corporation, 9705 Cottage Grove Ave., Chicago, Ill. Sept. 29, page 476.



Water and Oil Separator for Compressed-Air

Air enters the "Dryair" separator at the bottom at a tangent, giving it a whirling motion, which action precipitates a large percentage of the moisture. From this lower chamber to the outlet the air passed through three baffles, two of which are made of finely graduated bronze screening and spaced in the body as shown. The moisture particles removed from the air fall to the bottom and pass to an automatic trap incorporated in a separate chamber.

James A. Murphy & Company, Hamilton, Ohio. Oct. 13, page 547.

Silencer for Compressors and Blowers

The Burgess silencer consists of a perforated pipe surrounded by a sound-absorbing material, the whole being inclosed in a jacket or shell. With this design a straight opening is provided through the muffler equal to the inside area of the pipe line. The sound waves expand into the absorbing material and are destroyed. Sizes range from ⅜ to 6 in.

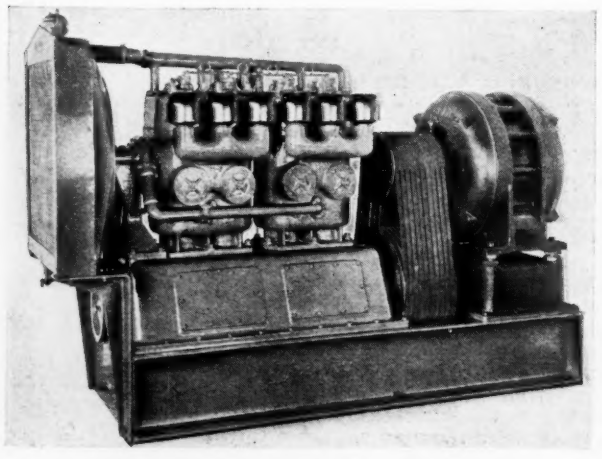
Burgess Battery Company, 111 West Monroe St., Chicago, Ill. July 14, page 67.

Supercharged Stationary Air Compressors

Available in displacement capacities from 100 to 1,200 cu.ft. per minute, this air compressor incorporates the Rix patented supercharger principle. A V-belt drive can be supplied or a direct-connected motor is available. An automotive radiator core is used for cooling, making a completely self-contained unit, or the compressor may be cooled with circulating water from the service main if desired.

On its up stroke the trunk-type piston draws air into the annular space between the trunk and cylinder wall through an auxiliary suction valve. On the down stroke this air is trapped and compressed into the annular cored space in the cylinder wall between the water jackets. Just before the bottom of the stroke is reached this air passes into the upper part of the cylinder, where it joins the air drawn into the cylinder in the normal way.

LeRoi Company, Milwaukee, Wis. Jan. 26, 1932, page 147.



Boilers, Refractories and Accessories

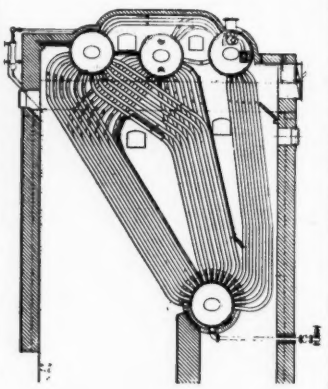
Low-head bent-tube boilers in sizes up to 6,000 sq.ft., multiple-circulation units with steam liberated in two drums, standardized steam generators, cross baffles with curved instead of square corners and improved water gages are among recent additions

Multiple-Circulation Boiler

Steam liberation in two drums instead of one is a feature of this multiple-circulation boiler. The tubes in the first pass are arranged so that half of them enter the front drum and the other half enter the middle drum. The tubes in the second pass are arranged similarly.

This splitting of the circulation tends to equalize the steam liberation in the upper front and middle drums and thus eliminates the usual intense turbulence where the greater part of the steam is liberated in the front drum.

This boiler is available in sizes ranging from 2,000 sq.ft.

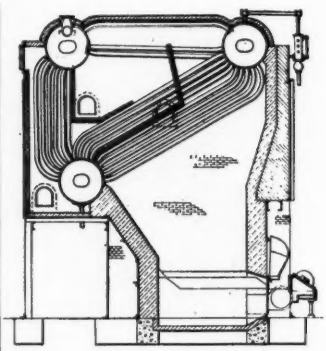


to 26,000 sq.ft. of heating surface. It is adaptable to any type of firing and may be set double.

Combustion Engineering Corporation, 200 Madison Ave., New York City. Nov. 10, page 689.

Low-Head Bent-Tube Boiler

Circulation in this boiler is much the same as in a cross-drum type, a variation being the substitution of drums for the ordinary stayed headers. Feed water enters the upper rear drum and descends through a



short economizer section to the mud drum. From this lower drum the water enters the main circulating bank, passing through the lower tubes to the upper front drum and returning through the upper tubes of the bank.

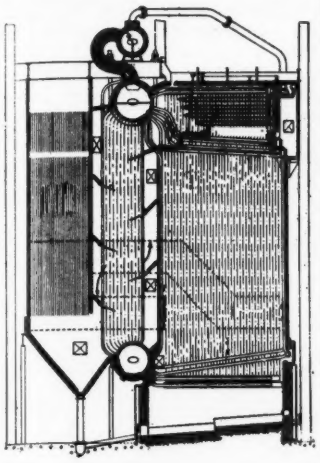
The steam is liberated in the front drum and must pass around a projecting baffle into the dry tubes, which deliver it to the rear drum. These boilers are made in all sizes from 1,000 to 6,000 sq.ft. of surface, and for all methods of firing. The baffling is flexible, so that the arrangement may be varied for different methods of firing.

Freeman Manufacturing Company, Racine, Wis. July 7, page 33.

Standardized Steam Generator

One standard design is now used for all eight sizes of this steam generator having capacities ranging from 70,000 to 400,000 lb. of steam an hour. The design represents a compact and simple arrangement, all pipes and headers essential for completing the circulating system of water walls being entirely within the casing.

All four walls of the furnace are water-cooled, each wall being composed of a solid row of tubes, with only sufficient space between them for construction requirements. The furnace is arranged for corner-tangential firing with pulverized



coal. A superheater bypass damper afford a means of controlling superheat temperature.

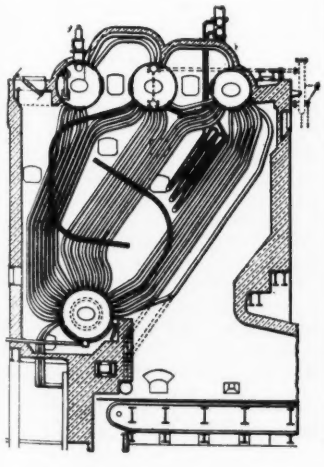
Combustion Engineering Corporation, 200 Madison Ave., New York City. Sept. 8, page 370.

Boiler Baffles With Curved Corners

Baffles with curved corners instead of square corners, as is usual practice, is a recent development in cross baffles for bent-tube boilers. This design provides a large opening for the first pass and places about 60 per cent of the heating surface in that pass. It also gives an increasing velocity as the gases cool, tending to maintain the rate of heat transfer in the second and third passes.

The curved baffle is applicable to practically all sizes of standard bent-tube boilers using stokers, powdered coal, oil, hogged fuel or blast furnace gas. It is said to reduce the draft loss, prevent the formation of eddy currents, facilitate cleaning of the boiler by soot blowers, provide smoother passage for gas and eliminate dead gas pockets.

Engineer Company, 17 Battery Place, New York City. June 9, page 933.

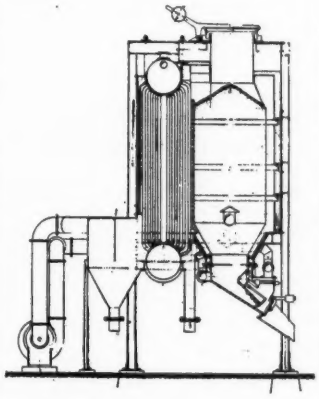


Insulating Firebrick Furnaces

No. 80 insulating firebrick is said not only to be a good insulator, but to be the equal of a first-quality firebrick, and when used as linings for intermittent furnaces will result in considerable fuel saving during heating-up periods.

The brick may be used without a facing of firebrick on the furnace side exposed to furnace temperatures and gases and protected only by a coating of high-temperature cement. It is suitable for lining oil- and gas-fired furnaces, electric furnaces of the resistance type and for coal-fired equipment wherever it may be used in protected wall areas not exposed to mechanical abrasion and slag action. The bricks may be cut, drilled or formed to any desired shape with ordinary wood working tools.

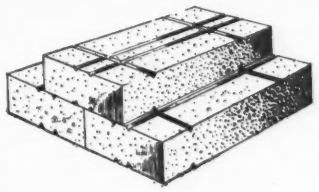
Babcock & Wilcox Company, 85 Liberty St., New York City. Aug. 4, page 179.



Steam-Generating Dry-Quenching Unit

This steam-generating dry-quenching unit consists of a brick-lined container and a water-tube boiler of the bent-tube type, both inclosed in a steel-plate, gas-tight housing built integral with the main supporting members. The boiler consists of two drums, connected by a bank of tubes baffled for three passes of the circulating gas. The tubes of the front row, forming one wall of the container, are faced with cast-iron blocks. The remaining three walls are built of firebrick. The coke-charging door is of the water-sealed type, and is operated through a motor and speed-reducer unit. The unit is designed to produce approximately 950 lb. of steam per ton of coke cooled for a power consumption of less than 3 kw.-hr. per ton.

Dry Quenching Equipment Corporation, 200 Madison Ave., New York City. Sept. 8, page 371.



Grooved Firebrick for Furnace-Walls

Right-Lock firebrick for boiler-furnace walls and for any service requiring standard firebrick are grooved on both sides. Bonding material in the corresponding grooves of adjoining brick lock the various rows horizontally and parallel to the hot wall face. This construction provides a flexible wall that tends to expand and contract in a straight line and thus eliminate wall bulging. "Right-Lock" brick are of standard firebrick size.

Power Plant Efficiency Company, Indianapolis, Ind. June 23, page 1009.

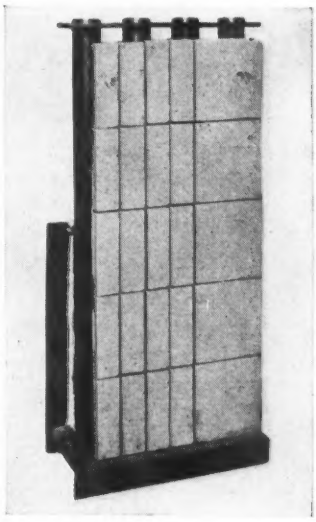
Small-Capacity Electric Steam Generators

Made in two pressure ratings, 100 and 200 lb. and in various sizes, the standard unit consists of a suitable steel shell in which one or more immersion heaters (depending upon the capacity required) are inserted. The generator is provided with standard boiler fittings, including a safety valve, steam gage, water column, blowoff valve, steam valve, etc. A typical control equipment consists of a magnetic switch and an automatic pressure governor which, when operated in conjunction with a low-water alarm, automatic heat shutoff switch and some device for automatically feeding additional water to the generator, makes the equipment automatic in operation. Several different kilowatt input ratings are obtainable for any given generator. The units are designed to operate on 115, 230 or 440 volts.

General Electric Company, Schenectady, N. Y. Jan. 19, 1932, page 111.

Water Wall With Toggle Assembly

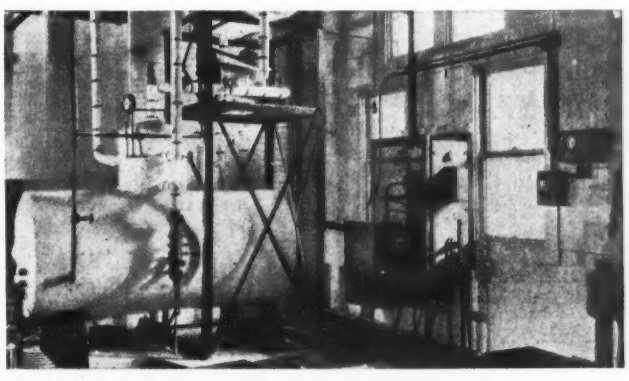
In this Type B water wall the blocks are fastened in pairs to the tubes by means of a pin and eye-bolt, forming a toggle assembly. The blocks are constructed so that they move around the periphery of the tube to maintain contact with the tube regardless of the change in alignment and spacing of the tubes or expansion of the block. Each pair of blocks is wedged between two tubes. This effects an arrangement whereby the growth of the cast iron of the blocks through continual exposure to high temperatures tends to make the contact between the blocks and the tubes tighter. Expansion due to rise in temperature likewise tends to increase the pressure between tube and block.



Foster Wheeler Corporation, 165 Broadway, New York City. Jan. 5, 1932, page 16.

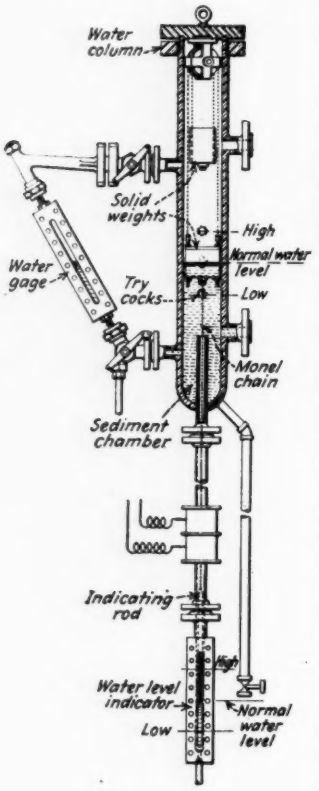
Eye-Line Water Level Indicator

To make the water level in the boiler drum of larger units readily visible to the man on the operating floor is the function of the "Eye-Line" gage.



This gage is offered as a companion product to the Yarway Hi-Lo alarm water column and the Se-Sure water gage.

The gage is connected to the bottom of the water column. A stainless-steel tube extends down from the column to the boiler room level, where it connects to a flat glass gage incorporating a movable plunger designed to indicate the water level in the boiler drum. This plunger is connected by a stainless-steel or monel-metal chain with the

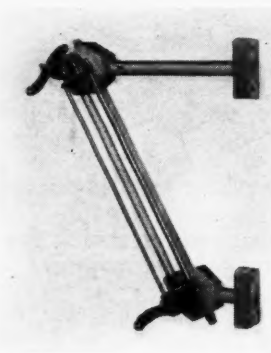


actuating balance weights in the water column.

The lower weight, from which the indicating plunger is suspended, rises and falls with the changes in water level in the column, thus causing a corresponding change in the position of the plunger.

If a remote indication or record is desired, an induction coil is mounted on the pipe above the indicator. In this case an iron core is inserted inside a non-magnetic pipe and actuated by the chain supporting the eye-level indicating plunger. The induction coil is in turn connected electrically with indicating or recording instruments. Where it may not be possible to drop the indicator vertically from the water column on the drum an auxiliary water column is used. As the water in the eye-line gage remains at practically room temperature, no erosion of the glass takes place.

Yarnall-Waring Company, Mermaid Ave., Philadelphia, Pa. Jan. 26, 1932, page 148.

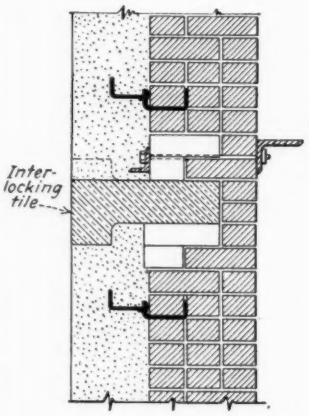


Water Gage With Tubular Brace

Whether used for high-pressure round or flat glass, an inclined tubular brace forms a steam and a water connection between the upper and lower mountings of this inclined water gage.

The equalized temperature which results from the steam and water in the tubular brace tends to remove all strain from the gage glass and prevent distortion due to unequal expansion and contraction. This, in turn, materially lengthens the life of the gage glass.

Wright-Austin Company, 409 Griswold St., Detroit, Mich. March 17, page 459.



Corbel Tile for Supporting Furnace Linings

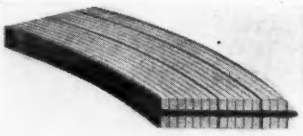
To support the firebrick alongside the tubes so that in replacing the lining there will be no possibility of the firebrick lining above the tubes falling down is the function of Corbel interlocking tile. By using these tile a monolithic wall may be divided into several independent sections, with each section supported by a row of tile. These tiles transfer the weight of the various sections to the exterior brick wall.

Plibrico Jointless Firebrick Company, 1850 Kingsbury St., Chicago, Ill. Jan. 12, 1932, page 76.

Improved Manhole Gasket

This improved manhole gasket is made up of alternate metal and asbestos rings with double thickness of metal on the inner and outer circumferences as well as at two intermediate points. The metal strips have a V-shaped spring-like crease lengthwise.

The inner and outer rings of the gasket are crimped to secure them in place and the intermediate reinforcing rings insure against the gasket's spreading under pressure. The gasket



can be furnished with metal strips of steel, monel, copper, aluminum, bronze or stainless steel.

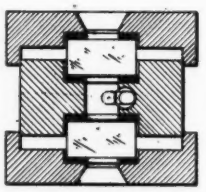
Flexitallic Gasket Company, 8th and Bailey St., Camden, N. J. Oct. 20, page 582.

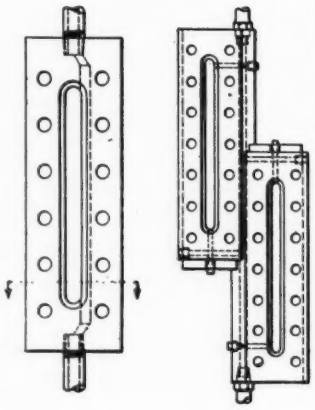
Water Gage With Condensate Guide

Incorporating a condensate guide consisting of a channel of circular cross-section drilled through the body parallel to, and connected with, the glass chamber, this gage is said to give improved visibility and increased life of the glass. The top and bottom gage connections discharge directly into the condensate guide, thus causing the condensate to run down the guide instead of down the glass.

The gage inserts are machined from solid rolled steel bars, and the gage valves are of forged steel, monel-trimmed, with renewable seats. The gage is made in two- and four-glass types.

Yarnall-Waring Company, Mermaid Ave., Philadelphia, Pa. Sept. 15, page 406.



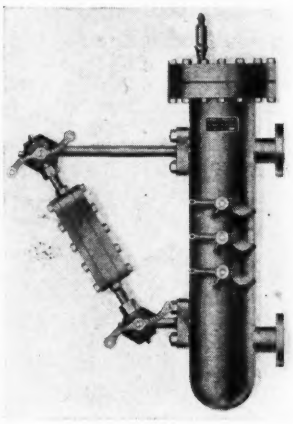


Water Column for 650 Lb.

Designed for 650 lb. working pressure, the body of this water column is a single steel forging. The flanges are drop-forgings and the stud and bolts are chrome steel. A tongue-and-groove joint connects the cover to the body.

The water gage is connected to the column by heavy bolts and flanges. Three trycocks of chrome steel for 650 lb. pressure are mounted on the side.

Wright Austin Company, 409 Griswold St., Detroit, Mich. Feb. 17, page 309.

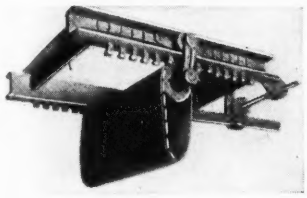


Powercoater for Boiler Tubes

For the application of the protective coating "Apexior" to the internal tube surfaces of water-tube boilers an improved power coater is now available for attaching to a standard tube cleaner. The powercoater consists of two short arms mounted in a circular base, which open out in a V-formation by centrifugal force. There are two removable bristle brushes with die-cast backs fastened to the ends of the arms. The freedom of movement of the arms in the base, and of the brushes on the arms, allows for the adjustment of the brushes to the surface of the tube as the powercoater is rotated. The brushes pick up the coating liquid which has previously been deposited in the tube and brush and scrub it into the surface of the metal.

Dampney Company of America, Hyde Park, Mass. June 2, page 897.

Coal- and Ash-Handling Equipment



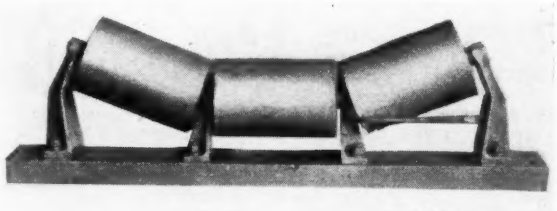
Bunker Apron-Type Gate

A rack and pinion are used to open and close this apron gate, which it is claimed can easily be operated by one man. In opening, the carriage is pulled back, the lower rollers lift the cross bars one at a time and a cam disengages the hooks. In closing, the opposite action takes place; the bars are lifted into place by the rollers and the cam engages the hooks. The gate can be used with coal bunkers and practically all classes of storage bins.

Stephens-Adamson Manufacturing Company, Aurora, Ill. Jan. 26, 1932, page 148.

Belt Conveyor Idler

The bearings of each pulley on this conveyor idler are provided with a positive screw adjustment so arranged that wear may be taken up without removing the pulley from the supporting brackets. These renewable shells are made from seamless-steel tubing ½ in. thick and 6 in. in diameter.

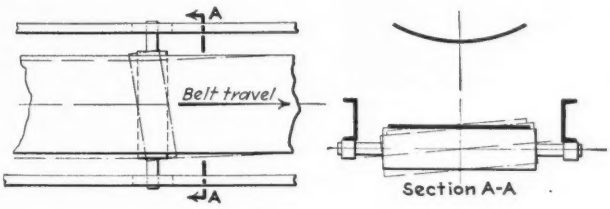


Open tops in the brackets permit any pulley to be removed without disturbing the bracket or adjacent pulley. A single grease-fitting serves to lubricate the two bearings of each pulley in the troughing idlers. Nine sizes for belt widths ranging from 18 to 60 in. are available.

C. O. Bartlett & Snow Company, 6235 Harvard Ave., Cleveland, Ohio. July 14, page 66.

Trainer for Return Strand of Conveyors

Edge wear and other damage to the return strand of a belt conveyor caused by crooked running is prevented by the use of this belt trainer, made in all belt widths from 12 to 48 in. A tubular roller mounted upon a single anti-friction bearing at its center is located on the centerline of the conveyor and inclined forward about 30 deg. The roller not only rotates freely on the bearing but also rocks about the pivot.

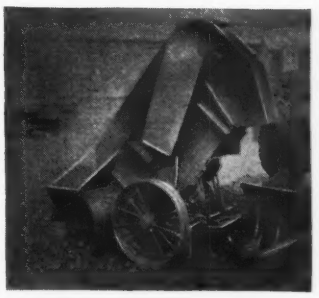


In service the action of the pulley, if the belt tends to run to one side, is to become skewed with relation to the belt and cause the belt to move back to the conveyor center line. Under normal conditions the use of a belt trainer in place of every eighth standard return idler (or about every 80 ft.) will give satisfactory operation. The trainer pulleys are interchangeable with the Robins standard return idlers and may be modified to suit other equipment.

Robins Conveying Belt Company, 15 Park Row, New York City. Oct. 27, page 619.

Bucket Loader

Although designed primarily for small-sized coal, model 63 loader will handle any bulk material which contains no greater than 4-in. lumps. Its small size makes it suited to operation inside bins or box cars. It is self-feeding, crowding itself into the material by means of a pawl-and-ratchet feeding mechanism. By reversing the pawl, the feeding drive is reversed for backing out of the material. Five speeds are available in either direction. The feeding device is a 24-in.-diameter spiral ribbon. Two 30-in. roller bearing wheels with a 6-in. face and a 10-in. roller bearing caster wheel for steering are the mounting for the loader. A 5-hp., ball-bearing, totally inclosed motor is the driving unit.



Barber-Greene Company, Aurora, Ill. April 14, page 603.

Constant-Weight Feeder

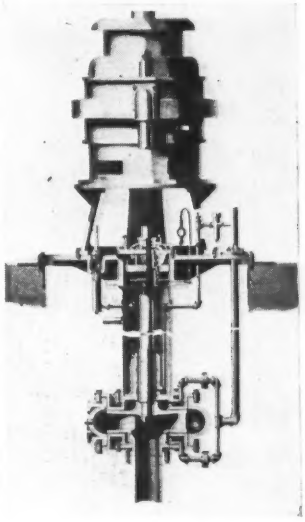
Known as Type D, this constant-weight feeder is a heavy-duty machine, built much stronger than the standard types previously available. It is supplied in capacities ranging from 10 to 1,000 tons per hour to handle material ranging from fine powder to lumps. This model is identical in principle with the stanadard unit, but it has been provided with additional idlers for supporting the conveyor belt. It may be equipped with a remote-control and with a no-load cutoff device which instantly stops the machine and signals the operator when the feed is interrupted.

Hardinge Company, York, Pa. June 9, page 933.

Centrifugal Pump for Ash Sluicing

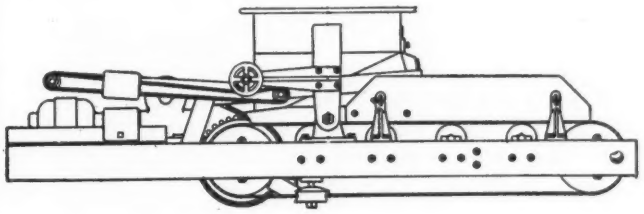
In this pump, which is made in horizontal and vertical patterns designed especially for handling abrasive-material-laden liquids, the running clearances are sealed with clear water at a higher pressure than the discharge pressure in the main volute.

Clean water at comparatively low pressure is connected to a chamber on each side of the impeller. Owing to the adhesion of this water to the side surfaces of the impeller and because of the close clearances the initial pressure of the clear water is boosted above the pressure on the main volute. Thus the annular clearances are continuously filled with clear water flowing into the volute, and this keeps these spaces clear of abrasive particles. A long bearing is provided adjacent to the impeller in both the vertical and horizontal pumps. The shaft is chromium-plated at the bearing.



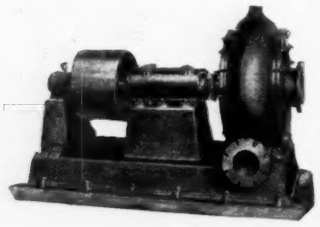
The thrust bearing on each pump is of the double-row, angular-contact ball type. The volute is of the solid non-split type and of heavy construction, while the impeller is of the totally inclosed overhung type with passages designed to permit free flow of material of a maximum size. The pump is equally well suited to handling of sand, gravel, coal sludge and other abrasive-like liquids.

Allen-Sherman-Hoff Company, 227 South 15th St., Philadelphia, Pa. May 5, page 718.



Abrasive-Materials Handling Pump

Type C centrifugal pump is designed especially for handling abrasive materials. The bearings are interchangeable in the field, either sleeve or anti-friction types being available. Lubrication is required only on the



main bearings, except where an outboard bearing is used. The impeller clearance and main bearings can be adjusted without dismantling the pump, and the bearings and bearing supports have been designed to absorb all thrust and radial shocks.

American Manganese Steel Company, Chicago Heights, Ill. Sept. 29, page 476.

Ash Hopper for Use Over a Sluice

To discharge the ashes from an underfeed stoker to the sluice in the proper condition for effective sluicing is the purpose of this new ash hopper.

Although similar in appearance, the auxiliary feeder rolls used with the hopper are not intended to replace the stoker crusher rolls, but simply to feed the ash to the sluice at a constant rate. The auxiliary rolls are driven by the mechanism used to drive the stoker crusher rolls.

The hopper is fabricated of ½-in. cast-iron plate sections which have overlapping, interlocking edges on all four sides. A gas seal, consisting of a pair of gates which slide together, closing off the opening, is provided. The drive for the gates is hand-operated and is positive in either direction. The use of this hopper gives positive discharge of ash with no danger of plugging the sluice. It can be used with underfeed, overfeed and chain-grate stokers or readily adapted for pulverized coal.

American Engineering Company, Philadelphia, Pa. Sept. 29, page 475.

Duplex Car Unloader

Powered by a 10-hp. gasoline engine or a 7½-hp. electric motor, this one-man car-unloading unit has a capacity of one ton of coal per minute. It is mounted on a narrow-gage industrial track which parallels

the railroad track at the same height.

For building up storage piles from trestles with a minimum of breakage, the boom is equipped with a hoist and cable so that it may be lowered 25 deg. below horizontal and raised with the growth of the pile to 40 deg. above.

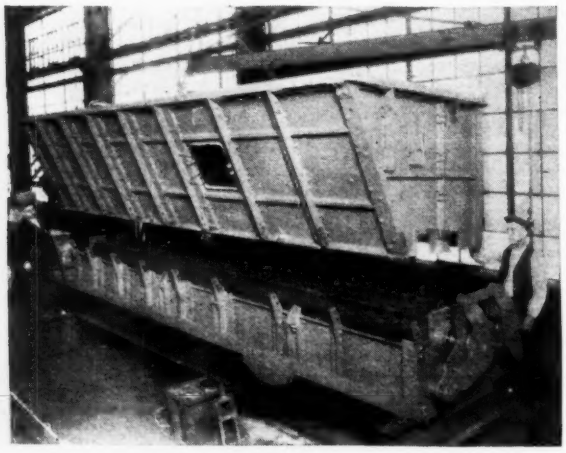
Barber-Greene Company, Aurora, Ill. Aug. 11, page 215.

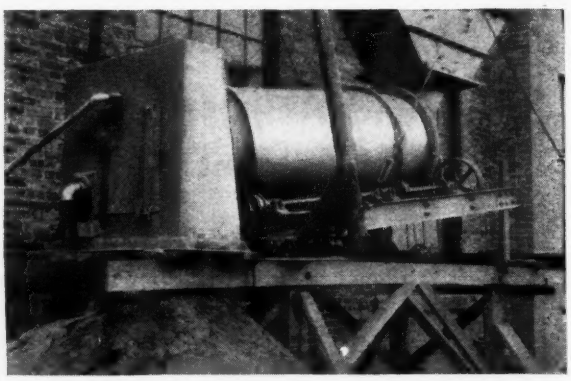
Equipment to Eliminate Fly Ash Dust

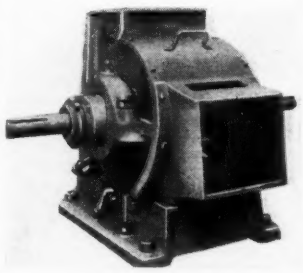
To provide a satisfactory solution to the problem of dustless handling of the fly ash is the function of this mixing equipment. The unit consists of a large rotating steel drum, inclined toward the outlet end and provided with a series of water sprays and a scraper arm which extends the length of the drum.

When ready to operate, turning the water on to the sprays automatically starts the motor which drives the drum. As ash is fed into the drum the moisture causes it to stick to the sides and be carried up on the shell until it is plowed off in a thin sheet by the scraper and caused to roll down to the bottom of the drum. During this operation the ash is sprayed constantly and mixed with the water, so that it is discharged from the drum in a loose, fluffy, but dustless, condition. At completion of the operation the drum cleans itself of the ash.

United Conveyor Corporation, Old Colony Bldg., Chicago, Ill. July 21, page 105.







Hog for Reducing Wood Waste

Capable of reducing all kinds of wood waste and other materials into a product ranging from a fine sawdust to a coarse fuel chip, this Type A hog has a capacity of from 1,500 to 4,000 lb. an hour, depending on the character of the material and fineness to which it is reduced. A series of interchangeable screens are supplied.

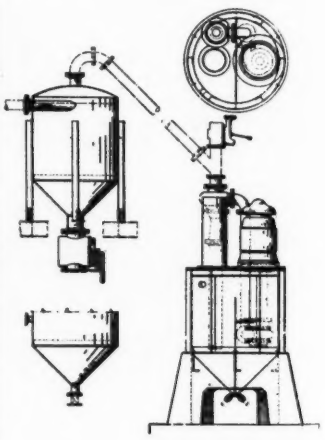
The shaft is arranged double-ended, so that the drive can be from either side; it can be arranged with pulley for belt drive, flexible coupling for direct-connected drive or with grooved pulley for V-belts. The grinding element consists of four rotating knives and four stationary knives.

Mitts & Merrill, Saginaw, Mich. March 31, page 530.

Hydrovacuum Unit for Handling Soot and Siftings

Ability to handle various other materials in addition to soot, siftings and floor sweepings in power plants is a feature of this hydrovacuum unit. It consists of a "hydroseal" pump which delivers water at high pressure through a hydrovactor and discharges through a nozzle ring, creating a high vacuum. The water discharges into a sump tank and is recirculated. The vacuum side of the hydrovactor is connected to the collector tank, into which the soot or other material is drawn in a dry condition. The unit is designed to handle between 10 and 15 tons of fine material an hour through a 4-in. header, and the material may be discharged dry or wet, as desired.

The unit can be applied to soot handling by the application

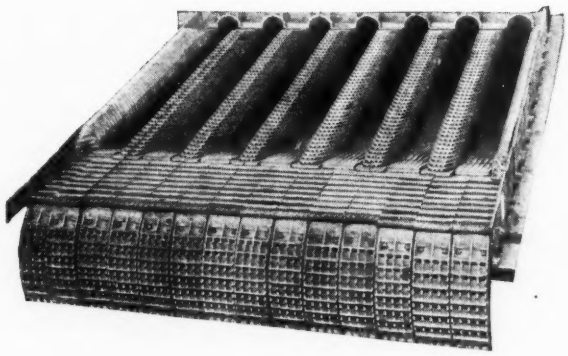


of standard A-S-H wind-swept valves beneath the soot-collection hoppers. For handling siftings, wind-swept valves are used beneath the siftings hopper and cyclone collector tank. To adapt this hydrovacuum unit to cleaning plant floors, various types of equipment, and other services, vacuum cleaner nozzles are applied.

Allen-Sherman-Hoff Company, 227 South 15th St., Philadelphia, Pa. July 28, page 140.

Fuel-Burning Equipment

Recent contributions in this field are multi-retort underfeed stoker with new design of substructure and drive; small stokers of underfeed, overfeed and chain-grate types for power and heating boilers. New ball and grinding-ring-type pulverizer, improved table-roll unit and burner of unusually large capacity



Multiple-Retort Underfeed Stoker

An important feature of the Riley Model R stoker is the design of the substructure or frame on which the stoker is built. In the front unit, comprising the coal-feeding mechanism, three heavy angles tie together the cylinders and crankshaft brackets and a channel ties into the front structure and provides support for one end of the longitudinal structural members, the other ends of which rest in shoes that are free to slide on the baseplate.

Another important change is the method of mounting the side bars. They now rest at the front and rear ends on self-aligning shoes and the side bars now serve to transmit motion only.

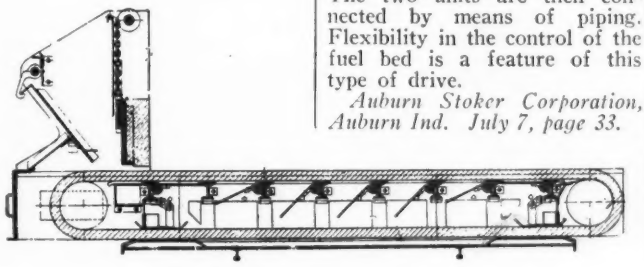
The new gear box retains the double-reduction worm-drive using cut worms of hardened and polished alloy steel. It has two speeds and a neutral position, the change in speed being obtained by means of a planetary clutch. The drive shaft is placed above the oil level to prevent leakage and obviate packing troubles. Both worm shafts are equipped with roller bearings.

In the new coal hopper each cylinder has its hopper connection provided with an inspection opening and a shutoff slide so that coal may be cut off from any one cylinder in case of a stoppage which does not readily clear itself. The hopper is equipped with an agitator to insure positive coal feed. Dump plates, of the rocker-plate type, are used on the smaller units, but on larger units clinker grinders, either of the single- or double-roll type, may be supplied.

Riley Stoker Corporation, Worcester, Mass. Dec. 29, page 948.

Chain-Grate for Small Boilers

All of the features of the standard Illinois stoker have been duplicated in this Junior unit for smaller boilers ranging in size from 1,000 to 2,500 sq.ft. of surface. From top to bottom of chain strands the new stoker has a height of 14 in., so that it may be used readily under low-set boilers with little or no excavation. The drive is the same as for the standard forced-draft stoker, consisting of a double worm-and-gear reduction embodying a shear-pin device and two-way thrust cap. The natural-draft stoker is practically the same as the forced-draft type except that the front riding seals, the bottom seal plate, the provisions for chain cooling, and the dust cover are omitted, and links with greater air spaces in the chain are used.



The maximum size of the Junior stoker in either type is 4 ft. 6 in. wide x 9 ft. 8 in. long. Installation may be made under 5-ft. settings. The stoker is operated by a 900-r.p.m. constant-speed motor belted to the stoker drive through a variable-speed pulley which allows a reduction in speed of from 50 to 75 per cent. There is a damper for each foot of grate length, and the stoker is designed to burn a wide range of coals.

Illinois Stoker Company, Alton, Ill. March 17, page 457.

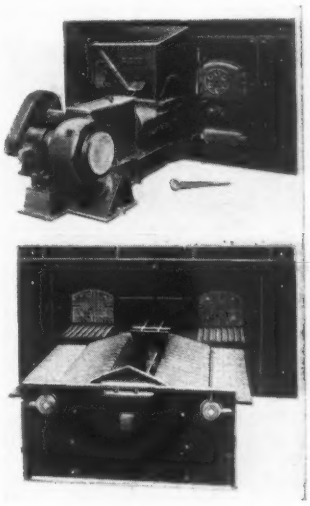
Small Hydraulically Driven Stoker

The important features of the larger Auburn stokers are incorporated in this smaller unit particularly adapted for heating requirements between 1,500 and 7,500 sq.ft. radiation and for small power boilers. The stoker consists of two units—the power unit, comprising the fan, motor and oil pressure pump, and the stoker unit, consisting of the hydraulic motor, ram, retort and tuyère assembly. The power unit may be placed in front of the stoker, or where space is limited it may be placed in any position adjacent to the stoker. The two units are then connected by means of piping. Flexibility in the control of the fuel bed is a feature of this type of drive.

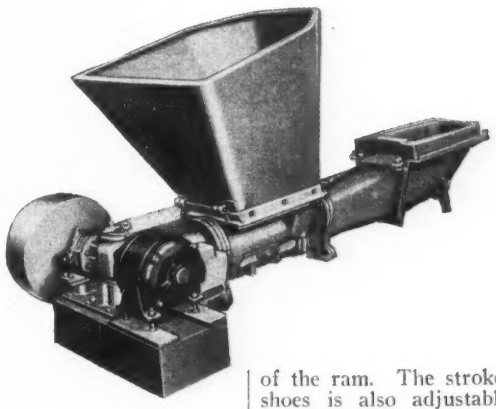
Auburn Stoker Corporation, Auburn Ind. July 7, page 33.

Unit-Type Underfeed Stoker

The McClave junior unit-type underfeed stoker is built in sizes suitable for heating boilers and small industrial boilers ranging from 350 to 1,500 sq.ft. of heating surface. The forced-draft fan and stoker drive are combined in a compact unit.



Coal is fed to the single retort of the stoker by a ram fitted with an adjustable connecting rod, giving a ready means of regulating the amount. In the retort the coal is distributed by shoes operated from an extension on the bottom side of the ram. The stroke of the shoes is also adjustable. The grate surface is composed of heavy sectional retort tuyères and sectional side ash-dump plates.

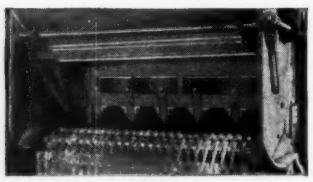


McClave-Brooks Company, Scranton, Pa. Sept. 29, page 477.

Coal Spreader and Gasifier

To so ridge the fuel bed on a chain grate that the volatile will be driven off quickly and burned under the arch, leaving a practically uniform bed of coke to be carried through the furnace is the purpose of the Gebhardt coal spreader.

Heat-resisting metal spuds faced with suitably shaped refractory blocks are supported by cast-steel hanger bars attached to the front of the coal gate. Notched slots in the bars for the supporting bolts permit adjustment of the spud height. These arrow-shaped spuds form



longitudinal ridges in the fuel bed as it passes under the gate.

Through the thin bed of coal along the grooves passes much of the air for combustion to burn the coal on the sides of the ridges and mix with the volatile driven off by the heat of burning and the reflected heat from a properly designed arch. In the ridges the green coal expands, cokes and levels off into grooves, giving practically a uniform fuel bed as the coke passes out from under the arch.

The burning surface of the coal is increased from 25 to 38 per cent, according to the width of the stoker, giving relatively larger capacities.

Gebhardt Company, Inc., 543 South Dearborn St., Chicago, Ill. July 7, page 32.

Self-Contained Coal Burner

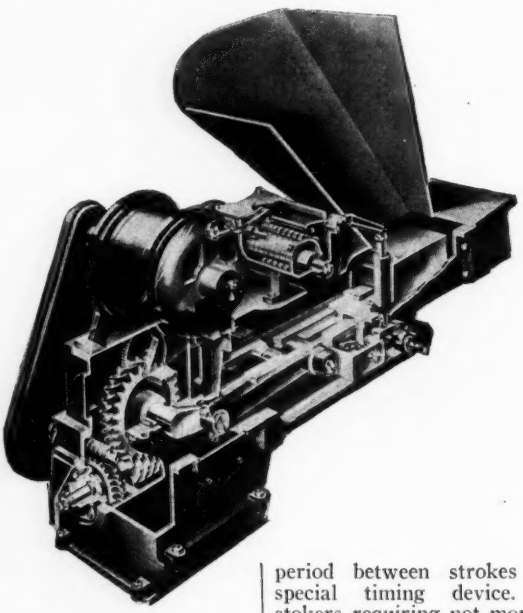
A screw feed and an air blast are the means used in this stoker to force the coal into the furnace. The finer particles of coal burn in suspension, while the coarser pieces settle and burn on a pin-hole grate provided with forced draft. The machine is being made in two sizes, one with capacity to burn 200 to 800 lb. of coal per hour, and the other 800 to 2,000 pounds.

The entire burner unit is mounted on a wheeled truck running on rails. Thus the unit may be moved back from the furnace front. The burner also is pivoted so that the feeder head may be moved up or down to correspond to the elevation of the opening into the furnace. From the storage hopper the fuel is forced to the feeder head by a screw conveyor, from which it drops onto a 45-deg. deflecting plate leading to a grooved casting that guides the coal into the furnace. Under the plate is a blast of air supplied by the motor-driven fan attached to the feeder head. Either alternating-current or direct-current motors may be used.

Aerio Coal Burner Sales Corporation, 1440 Ford Road, Dearborn, Mich. Oct. 27, page 619.

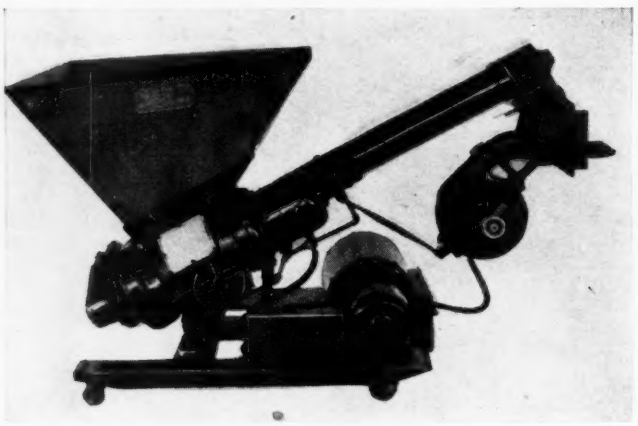
Electric Drive for Types E and K Stokers

Available as standard equipment for both Type E and Type K stokers, this drive consists



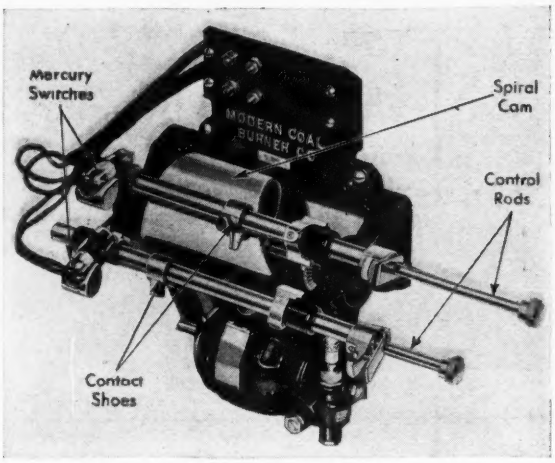
of a constant-speed alternating-current or direct-current motor operating the driving mechanism through a gearbox containing a double worm drive. Variation of coal feed is accomplished by varying the number of strokes per minute while keeping the speed and length of the stroke constant. This is done by changing the length of the rest period between strokes by a special timing device. For stokers requiring not more than 7,500 c.f.m. of air the fan is an integral part of the drive unit. No clutch or variable-speed device is used in the drive.

Combustion Engineering Corporation, 200 Madison Ave., New York City. Dec. 8, page 843.



Coal Feed Regulator for Small Stokers

To overcome the difficulty encountered in the operation of the small motor-driven underfeed stokers, that of properly adjusting the coal feed to amount of air supplied by the forced-draft fan, the stoker regulator designated Feed-O-Meter has been developed. The regulator consists of a fractional-horsepower motor driving



a spiral cam through a large gear reduction so that the cam revolves once in approximately two minutes.

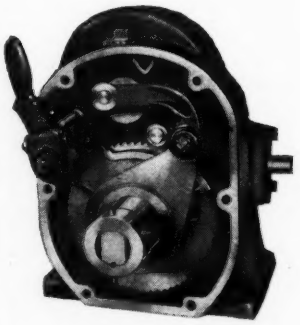
In the path of the revolving cam is one or more contact shoes which operate mercury switches arranged so that they fall into a closed position whenever the shoes are not in contact with the cam. One to four switches may be used to control one to four stokers independently.

The different settings, "on" and "off," are obtained by moving the control rods, on which the contact shoes are mounted, in or out. This moves the shoe so that it is nearer or farther from the apex of the spiral, which varies the interval from clear off to practically continuous running, with infinite combinations between. The regulator is applicable to any stoker that is driven by a motor and may be applied to other equipment.

Modern Coal Burner Company, 3733 Lincoln Ave., Chicago, Ill. April 28, page 678.

Drive Unit for Screw-Type Stokers

Available as a standardized drive unit for underfeed screw-type stokers this speed-reducing



transmission is made in coal-feeding capacities of 50 to 1,250 lb. per hour. Gear ratios can be provided to accommodate standard motor speeds of 1,160,

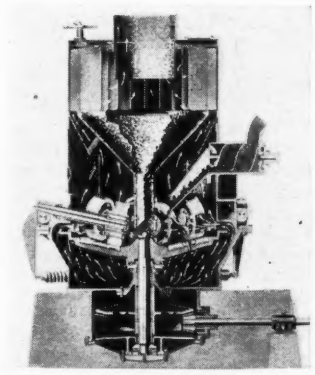
1,430 or 1,750 revolutions per minute.

First reduction in speed is through a worm and gear set with shafts mounted in oversize anti-friction bearings. Final reduction is through the medium of a three-speed adjustable ratchet, with overload shear-pin hub and full floating low-speed shaft. Speed changes are made through a single lever.

Link-Belt Company, 910 South Michigan Ave., Chicago, Ill. Jan. 12, 1932, page 75.

Improved Table-Roller Pulverizer

In this model of the improved (Bethlehem) table-roller pulverizer, the principle of grinding originally employed is retained. The coal is fed to the center of a cone-shaped, slowly revolving table, from which point it is caused to move outward in a thin layer by centrifugal action.

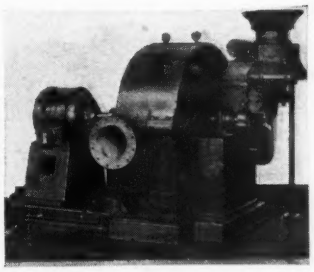


The new unit has been completely redesigned and important changes have been made in the design of the bearings, rollers and system of lubrication. One-piece tracks are now used in place of the segmental tracks originally employed on the grinding table. The labyrinth seal between the table and shaft bearing has been made more effective for keeping dust out of the bearing. An independently driven screw-type feeder is used.

Grindle Fuel Equipment Company, subsidiary of the Whiting Corporation, Harvey, Ill. Jan. 19, 1932, page 112.

Improved Unit Pulverizer

In this new design of the Atrita pulverizer the grinding chamber housing and fan chamber housing, which were previously made separate, are combined in one common housing. This change has decreased the over-all width of the machine about 8 in. The housings have also been changed to all-

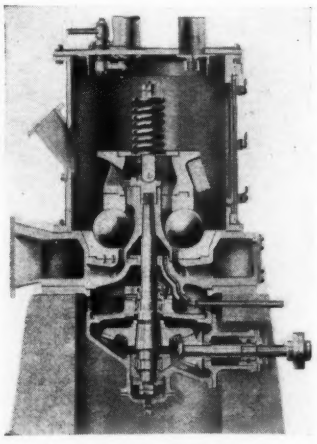


welded steel construction from cast iron. Better fineness, increased capacity and lower power consumption per unit of output are claimed for this unit.

Riley Stoker Corporation, Worcester, Mass. Oct. 6, page 512.

Small-Capacity Coal Pulverizer

The design of Type C pulverizer embodies the ball and grinding ring principle of pulverizing similar to that used in the Type B pulverizer. The pressure between the grinding parts is applied and maintained by a heavy spring. The coal, upon entering the mill, drops directly into the path of the grinding balls, and air for separating the fine particles enters the mill under pressure through the air inlet in the intermediate section. The air currents pass through this section into the annular passage between the stationary grinding ring and the driving yoke and, in flowing upward, pick up the finer particles of coal and re-



move them from the grinding zone.

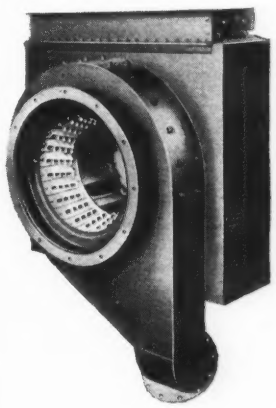
An overhanging flange cast around the top of the spinder prevents the streams from rising to the top of the mill until they are projected outward and subjected to the classifying action of the spider. Type C pulverizers are available in several sizes and capacities.

Fuller Lehigh Company, 85 Liberty St., New York City. Sept. 1, page 339.

High-Capacity Coal Burner

This burner has sufficient coal-burning capacity to produce 135,000 lb. of steam an hour, representing a heat liberation rate of over 205,000,000 B.t.u. an hour.

Coal and primary air enter the burner housing and are directed through tangential slots to the center. Secondary air enters through vanes which give it a whirling motion before passing to the center of the burner. Intense turbulence and positive mixing of coal and air are said to result from the whirling circular motion of the

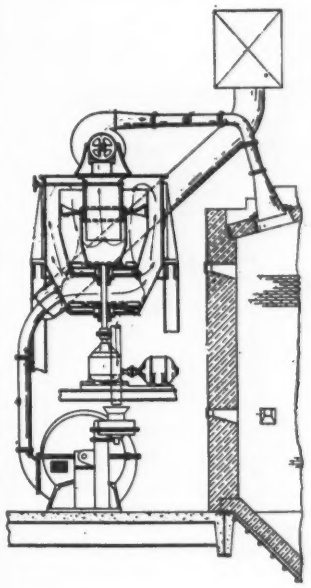


secondary air striking the multiple coal streams traveling in the line of the burner axis.

Riley Stoker Corporation, Worcester, Mass. Jan. 19, 1932, page 111.

Mechanical Separator for Pulverized Coal

With this cyclonic classifier in the mill and burner circuit the mill is fed to capacity regardless of fineness, with just enough air through the mill to transport the material, fine and coarse, into the bottom of the classifier. Secondary air, either hot or cold, is admitted to the separator at the same point. The extreme coarse particles drop out of the air current in the lower portion of the separator and are returned to the mill. The primary air from the mill and the secondary air currents carry the medium and fine particles of coal upward between the outer shell of the separator and an inner drum, passing over the top into the inner shell. At this point the air and material are brought into contact with a series of revolving paddles which throw the material outward and downward. The air currents at this point are drawn toward the center by the fan, and the cyclonic action thus produced throws the coarser particles downward to a revolving disk from which they are discharged to the mill feed hopper for further grinding. The fine particles are carried through the

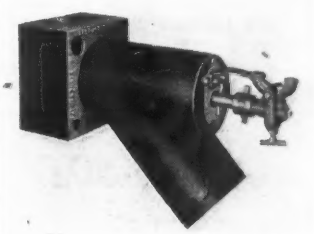


fan at the top of the separator to the burner.

Mechanical Cyclonic Classifier Company, 900 East Seventh St., Alton, Ill. Oct. 20, page 583.

Water-Cooled Gas Burner

Available in a number of sizes and capacities for burning gas, oil, or pulverized coal, separately or in combination, this high pressure gas burner is made of heat and corrosion-resisting material, and is arranged for water-cooling. Gas is supplied to the burner through a single inlet pipe, and delivered from a number of orifices placed around the circumference of an annular gas chamber.



The burner is offered in three sizes for 8, 6 or 3 in. pressure, air or pulverized-fuel connections. The gas inlets are 2, 1½ and 1 in., the water connections 1, ¾ and ½ in., respectively.

Lee B. Mettler Company, 406 South Main St., Los Angeles, Calif. March 3, page 383.

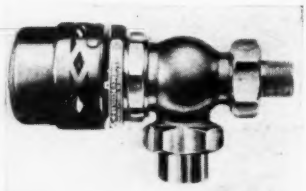
Heating and Ventilating Equipment

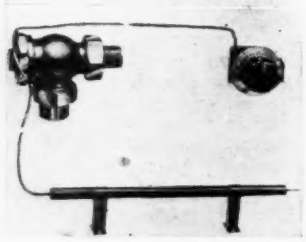
Radiator valves for concealed and exposed radiation, removable concealed radiators, atmospheric cabinets, air-conditioning units and stoker-fired tubular heater for large areas

Valves for Concealed and Exposed Radiation

For use on any two-pipe steam, vapor or vapor-vacuum heating systems, these radiator control valves are available in both globe and angle types, and utilize the standard sylphon metal bellows as the thermostatic member. The valve is of the packless type.

The automatic valve for concealed radiation offers balanced heat control. Two bulbs located inside the radiator cabinet regulate the room temperature by means of both the temperature of the air entering the inclosure and the temperature of the air leaving the cabinet.



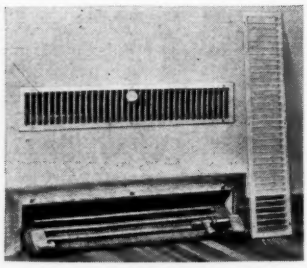


Fulton Sylphon Company, Knoxville, Tenn. Dec. 8, page 843.

Concealed Radiation

In order that the heating element in this concealed type radiator be non-corrosive, it is constructed of seamless drawn copper tubes connected to semi-steel cast-iron headers by a brass clamping nut which forms screwed ground joints. The copper tubes are wound with a continuous copper fin metallically attached to the tube by special lead alloy.

The casing of the radiator,



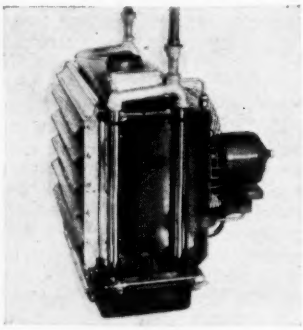
which is adjustable in height, is concealed within the wall and provided with an aluminum grille top and bottom. By removing the lower grille and disconnecting the steam pipes, the complete heating element may be removed as a unit.

C. A. Dunham Company, 230 East Ohio St., Chicago, Ill. April 14, page 603.

Unit Gas Air Heater

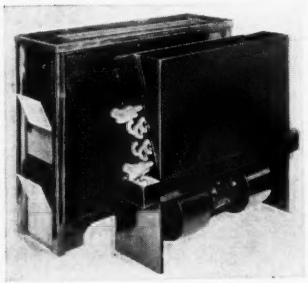
With an input rating of 200,000 B.t.u. an hour, the Humphrey No. 200 unit gas heater when equipped with a six-blade fan propelled by a ¼-hp., 1,140-r.p.m. motor, will deliver 2,600 cu.ft. of air a minute with a 50-deg. temperature rise over room temperature. Either manufactured or natural gas may be used.

Over-all dimensions are 32½ in. high, 28¼ in. wide and 31¼



in. deep. The unit may be operated by either remote or thermostatic control.

General Gas Light Company, Kalamazoo, Mich. March 10, page 418.



Atmospheric Cabinet to Replace Radiators

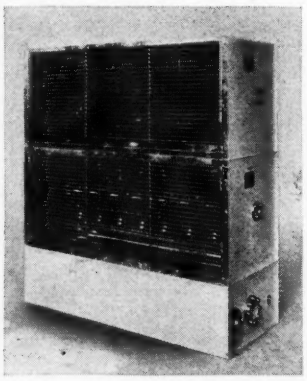
The present supply and return lines of steam or hot-water heating systems can be used for this atmospheric cabinet, designed to heat or cool, humidify or dehumidify and ventilate, by replacing the standard types of radiators now in use. To provide for cooling, the installation of supply and return lines from a source of refrigeration is the only piping required.

A pan-shaped humidifier is located between the heating coil and the motor and fan assembly, a filter for clearing the outside air and a heat transfer coil by means of which either recirculated or outside air may be heated or cooled, are additional features. Humidity regulation is obtained by adjusting the overflow control on the end of the humidifier.

Carrier-York Corporation, 1541 Sansom St., Philadelphia, Pa. June 2, page 896.

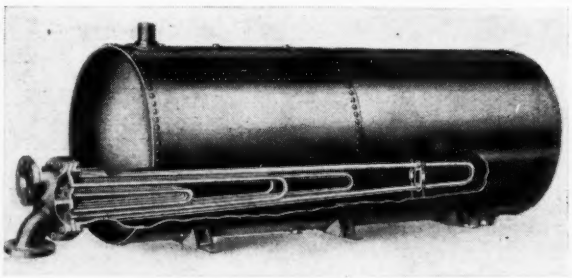
Sizes available range in capacity from 100 gal. per hour to 2,000 gal. per hour heated from 50 to 150 deg., with tank diameters ranging from 30 to 84 inches.

National Pipe Bending Company, Lloyd and River Sts., New Haven, Conn. Aug. 4, page 179.



Air-Conditioning Unit Built in Ten Sizes

Filticooler is the name given to this air-conditioning unit designed to filter, wash, cool and humidify the air passed through it. It is made in fifteen sizes, and is available in units of one, two or three sections, as required, each section being 20 in.



Submerged-Type Water-Heating Element

The distribution of the heating surface in the "Freflo" unit is effected by making each row of U-bends of an increasing diameter of tubing of varying lengths, from the smallest diameter and shortest length to the largest diameter and longest length. The entrance ends of the U-bends are spread to give a pitch or slope to the horizontal runs, thus preventing air or water pockets from forming in the tubes. The U-bends are of copper tubing expanded in either a steel or a bronze tube plate. The longest coil is flexibly supported near the outer end.

high and 28 in. deep in direction of air flow. Widths vary from 20½ in. for No. 1 size to 10 ft. 8½ in. for No. 10.

Each unit consists, essentially of two eliminators, two air filters and a set of spray nozzles. The air filters are continually flushed by water, which prevents their clogging up and reducing the air flow. The eliminators are divided in the middle and face both ways. The various types of automatic controlling devices used on other types of washers may be adapted to the Filticooler.

This unit occupies about half the space usually required for the standard type air washer of the same capacity.

B. F. Sturtevant Company, Hyde Park, Mass. March 10, page 419.

Propeller-Type Water Circulator

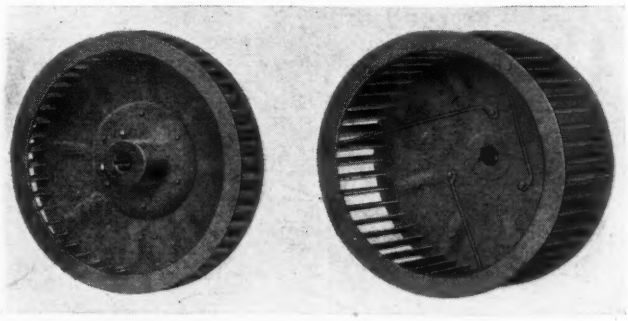
Designed, primarily, for eliminating sluggish circulation and improving the efficiency of a hot-water heating system, this circulator is also suitable for practically any circulating service where light liquids are used.

The unit is made to screw into an opening in a standard pipe fitting and is supported in proper operating position by the pipe fitting. It is made in three sizes, which can be readily adjusted for all pipe sizes from 1½ to 5 in. Approximate capacity ratings for the three sizes range from 750 to 14,000 gal. per hour.

Watts Regulator Company, 245 Lowell St., Lawrence, Mass. July 21, page 106.

Fan Wheels in Several Diameters and Widths

Offered in seven diameter sizes and in four widths, one-third, one-half, two-thirds and full, Type HV fan wheels consist of a large number of shallow steel blades anchored to the back plate and inlet rim. The back plate is rib-stamped and riveted to the hub, which may be internal or external.

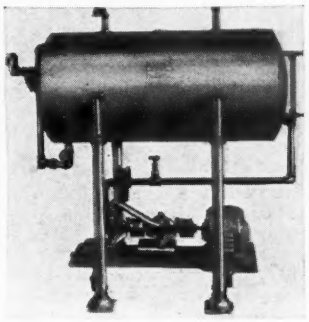


Full-width wheels in the larger sizes can be furnished with tierod braces connecting the back plate and inlet rim, and for extremely high speeds a peripheral rod bracing in addition to the tierod braces can be furnished. Two types of fan assemblies are also available. One consists of a Type HV fan wheel, housing inlet ring and inlet screen, and the other a complete fan with support for mounting the motor. In addition pulley-driven units can also be furnished.

Clarage Fan Company, Kalamazoo, Mich. Aug. 11, page 215.

Automatic Feed-Water Unit

This automatic feed-water unit is suitable for boiler capacities from 50 to 2,150 sq.ft. and for working pressures up to 125 lb. A receiving tank, motor pump and automatic control constitute the assembly. The tank receives condensate from return lines as well as the necessary make-up water from the city mains or other source of supply. Automatic operation of the pumping unit is regulated by a water-level control mounted on the boiler.



Make-up water to the receiver is regulated by a float-actuated valve mounted on the end of the tank. The receiver is equipped with telescoping legs by means of which its height may be changed. Sizes available for boiler pressures up to 60 lb. range in capacities from 120 to 1,320 gal. an hour; for pressures up to 100 lb., from 144 to 1,488 gal. an hour; and for pressures up to 125 lb., 120 to 1,296 gal. an hour.

Steam & Combustion Company, 205 West Wacker Drive, Chicago, Ill. March 24, page 494.

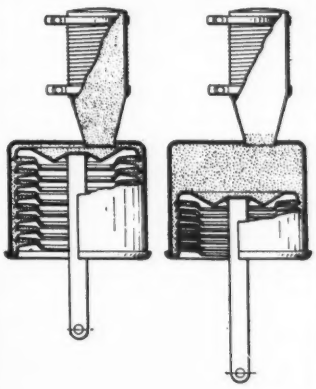
Small-Capacity Condensation Meters

Two small sizes, 250 lb. and 500 lb. an hour capacity, of Adsco rotary condensation meters are now available. The meters, similar in design to the larger Adsco rotary meters, contain six identical buckets locked in position at the rotor axis. As the buckets are filled, the weight of the condensate causes rotation, discharging the buckets and bringing empties successively into position for filling. The revolutions of the rotor are transmitted to the dial, which registers the measurement in pounds. The meters are now available in a complete range of sizes and capacities from 250 to 6,000 lb. of water an hour.

American District Steam Company, North Tonawanda, N. Y. Jan. 12, 1932, page 76.

Electric Vapor Motor for Heating Control

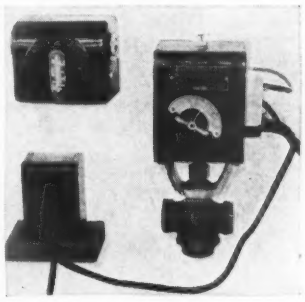
Electric current supplied to the heating element of the Cook electric vapor motor vaporizes a small quantity of liquid in the bulb. The vapor, in expanding, drives the remaining liquid out of the vaporizing bulb into the housing, forcing the flexible bellows to contract. This contraction moves the drive shaft through its stroke. The length of stroke and power developed are variable over a wide range by the use of bellows of the proper diameter and length and a vaporizing bulb of the right size. The timing can be varied by varying the heating element and the volatile liquid used in the bellows.



Cook Electric Company, 2700 Southport Ave., Chicago, Ill. Sept. 15, page 406.

Temperature Controller

This control, designated Superstat, is available in two forms, a damper-type regulator, a unit having an operating arm which moves through an arc of 90 deg., and a valve modulator, an operating unit mounted directly on a globe valve for complete closure or on a butterfly-type valve for intermediate flow control. In both units the operative member has eleven operating positions within its maximum travel.



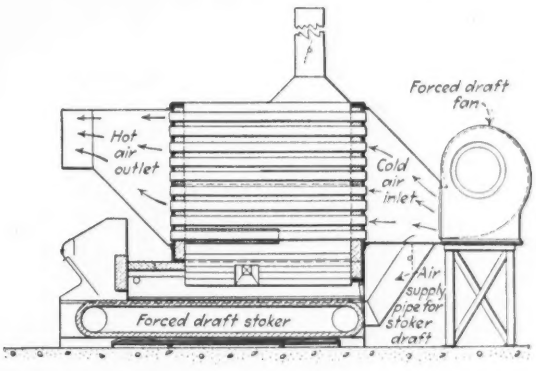
The control is designed to move in either direction from a given position upon ¼ of a deg. temperature change at the thermostatic element.

Superstat Company, Springfield, Mass. Jan. 26, 1932, page 148.

Heating Unit for Large Areas

Comprising a small chain-grate stoker and tubular air-heating section through which air is forced by a blower, this unit is intended for heating large shops and open structures.

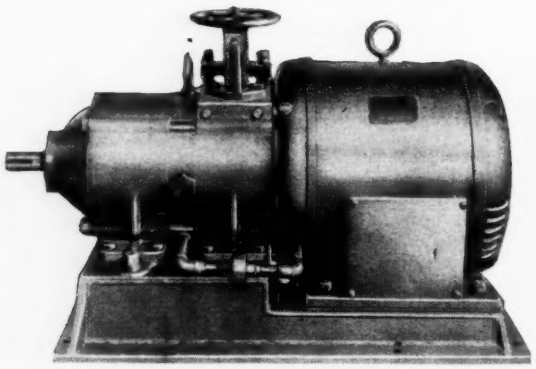
Dimensions of the unit are 5 ft. wide, 16 ft. long by 8 ft. high. No piping or other installation work is necessary other than providing a foundation, a stack connection and outlet connection to warm-air ducts, if distribution requires a division of the outlet stream of hot air into two or more ducts. The stoker is of the type regularly supplied for boilers from 500 to 2,500 sq.ft. of surface.



Illinois Stoker Company, Alton, Ill. Dec. 1, page 809.

Mechanical Transmissions

Unusual development has taken place in mechanical transmission embodying hydraulic. multi-speed motorized and spiral gear units, Also V-belt chain drives, and bearings



Electro-Hydraulic Transmission

In this electro-hydraulic transmission, designed to develop full rated torque at any speed from 1 to 1,100 r.p.m., the torque is constant and the horsepower output varies with the speed of the hydraulic motor. The hydraulic pump and electric motor are all mounted on a single bedplate reservoir which contains the oil used in the system. The entire transmission, including motor, is 30 in. long, 14 in. wide and 16 in. high. The hydraulic pump and motor are of Hele-Shaw design and are similar in construction except that the motor has a fixed stroke, while the stroke of the pump may be varied from minimum to maximum.

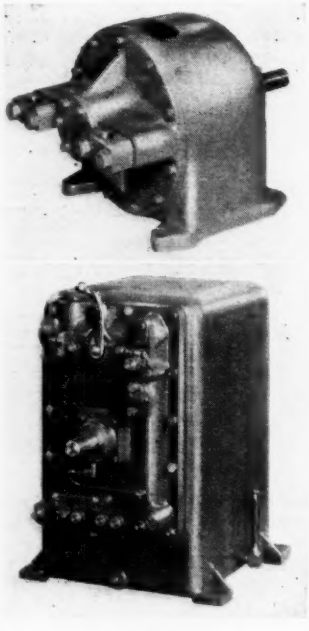
The motor drives the pump shaft at a constant speed. Oil is delivered by the pump to the hydraulic motor at a rate corresponding to the stroke of the pump, regulated by a handwheel on the top of the unit or other hand or automatic control. Through the handwheel, the speed of the hydraulic motor can be varied from zero to maximum in either direction.

American Engineering Company, Philadelphia, Pa. Jan. 19, 1932, page 111.

Variable-Speed Hydraulic Transmission

For application to conveyors, paper mill drives and other machinery where smooth rotary motion and variable speed are required a 1,500-lb. constant-displacement fluid motor and variable-delivery pump have been developed. A series of speed ratios practically independent of variations in load are available with these transmissions. By changing the output of the pump the fluid motor can be varied from 0 to 800 r.p.m.

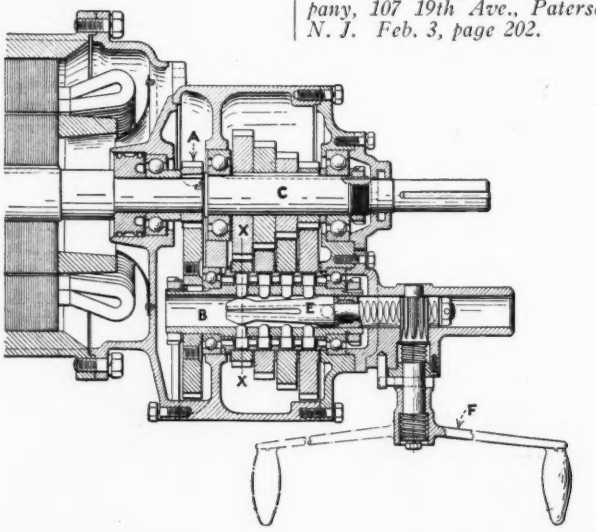
The 1,500-lb. pump is of the multiple-plunger type, with radially disposed cylinders. Stroke variation is accomplished by changing the eccentricity of the multiple-cylinder block with relation to the rotating piston carrier, which is on a fixed center. The two units are connected by ¾-in. pressure and return lines. The direction of rotation of the fluid motor can be reversed by interchanging the piping connections.



Oilgear Company, Milwaukee, Wis. Aug. 18, page 250.

Combination Multi-Speed Drive and Motor

Constructed to give four different speeds to the output shaft at constant horsepower, this multi-speed unit is applicable to a wide range of industrial operations, as the speed of the driven apparatus may be changed while the motor is running at full speed and under full load. The gear unit is mounted on a standard squirrel-cage Westinghouse induction motor. A pinion mounted on the motor shaft drives a gear mounted on a countershaft on which there are also four idling ring gears constantly in mesh with four gears on the output shaft.

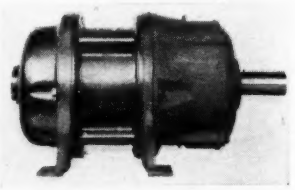


Each of the countershaft gears is provided with an internal clutch actuated by two tapered wedges which are forced between the clutch halves. Between each speed is a neutral position. The gearing in the first reduction, or drive from the motor to the countershaft, is of the single helical type and the other gears on the countershaft and those on the output shaft are of the spur type. The drive is offered in three units, ranging in rating from ½ to 7½ hp. The four speeds available in the gear drive itself, plus the availability of motors giving different driving speeds, makes it possible to choose a combination that covers a wide range of speeds.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. May 12, page 753.

Combined Motor and Reduction Gear

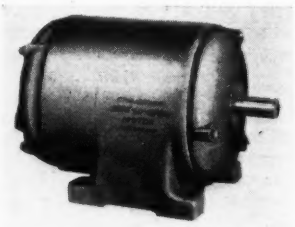
Except for a slight increase in over-all length, together with a larger shaft diameter than usual, the combination motor oil reduction gear is practically the same in appearance as the motor alone. The front gear motors are equipped with anti-friction bearings throughout, and are dustproof and oiltight. They are available for any speed motor from 3,600 r.p.m. down from ⅛ to 30 horsepower.



Watson-Flagg Machine Company, 107 19th Ave., Paterson, N. J. Feb. 3, page 202.

Motorized Speed Reducer

"Rite-Lo-Speed" motors are put out in four series and in sizes from 1 to 30 hp., with a junior model in sizes from ¼ to 1 hp. The gears comprising the power transmission are ball bearing mounted. Series S is standard, comprised of the motor and housing with a single power take-off. Series B is a single-motor unit with a gear housing at each end having two power take-offs at the same speed. Series D is a

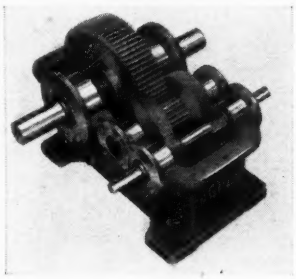


single-motor unit with gear housing at one end with power take-off at reduced speed and with a high-speed motor shaft extended through the rear end bell.

J. D. Christian, 512 Brannan St., San Francisco, Calif. July 14, page 67.

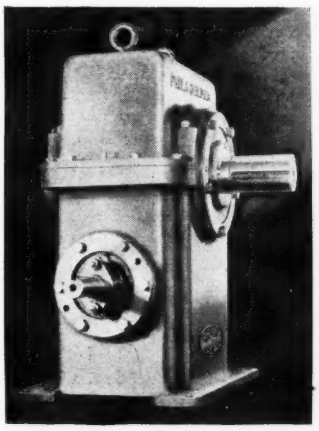
Small Speed Reducers

Capacities range up to 18 hp. and reduction ratios from 12 to 1 up to 48 to 1 in this series of small Herringbone-Maag speed reducers. The smallest reducer



in this series is $20\frac{5}{16}$ in. long and $14\frac{1}{4}$ in. high. All reducers have high- and low-speed shaft extensions on both sides. The high-speed pinion is forged integral with the shaft, of chrome-nickel steel. The low-speed pinion is also of chrome-nickel steel. Roller bearings are used throughout.

W. A. Jones Foundry & Machine Company, 4401 West Roosevelt Road, Chicago, Ill. Sept. 15, page 406.



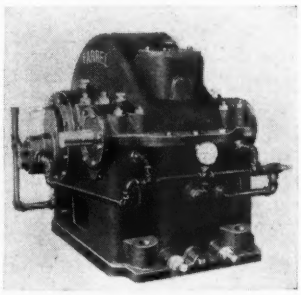
Speed Reducer With Rolled Steel Housings

Housings of welded rolled steel are now being used in place of cast iron on a line of speed reducers which includes vertical and horizontal worm-gear, spur-gear, herringbone and spiral bevel-gear units. These steel housings are claimed to be 75 to 100 per cent stronger than the cast iron.

Philadelphia Gear Works, Erie Ave. and G. St., Philadelphia, Pa. Sept. 22, page 441.

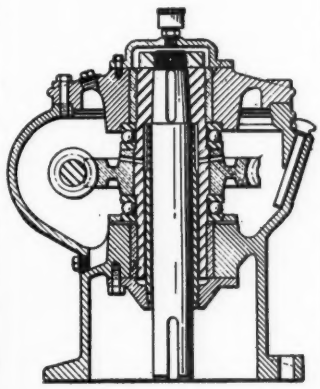
Units for Increasing or Reducing Speed

Suitable for speeds up to 6,000 r.p.m., and powers from 120 to 2,500 hp., with ratios up



to 10 to 1, for either increasing or reducing speeds, the gears used in this new series are the Farrel-Sykes herringbone continuous-tooth type. A complete lubrication system is provided, together with an oil cooler. Forced lubrication is provided for all bearings and spray lubrication for the gear teeth.

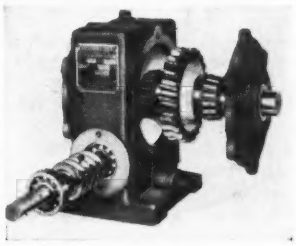
Farrel-Birmingham Company, Inc., 344 Vulcan St., Buffalo, N. Y. Dec. 8, page 842.



Oil Leakproof Vertical Speed Reducer

Packing glands, oil seals, etc., have been dispensed in this leakproof vertical worm speed reducer. A bronze worm gear ring is pressed on a splined hollow steel center and is held rigid on this center by two ball thrust bearings. This assembly is mounted on bronze bearings, and the hollow center is securely fastened to the vertical shaft at the uppermost part, forming a cavity for nearly the entire length of the shaft. In this space a tube is sealed and fastened to the lower part of the reducer, from where it extends upward to a point well above the oil level. This construction prevents any oil from leaking out.

Foote Brothers Gear & Machine Company, 111 North Canal St., Chicago, Ill. March 17, page 457.



Small Worm-Gear Speed Reducers

Types WB600 and WB700 speed reducers embody all the important features of the larger units made by the company. Some of these are worm forged integral with the shaft; hardened worm threads; face of solid bronze worm gear extra wide; and use of radial thrust ball bearings on the worm shaft and tapered roller bearings on the gear shaft. Gear ratios range from $4\frac{1}{8}$ to 60, and the maximum torque on gear shaft in inch-pounds is 1,100 lb. for the series WB600 and 2,140 lb. for the WB700 type.

Horsburgh & Scott Company, 5114 Hamilton Ave., Cleveland, Ohio. March 3, page 382.

Motorized Speed Reducer

This motorized unit consists of a standard or special-characteristic polyphase induction motor mounted integral with spur, helical, planetary or bevel gears. The low-speed shaft, from the speed reducer end, provides a speed as low as 20 r.p.m. or may be supplied with a speed of as high as 875 r.p.m. The opposite shaft, direct from the motor, provides high standard polyphase motor speeds of 1,800, 1,200, 800 or 720 r.p.m. For certain applications the unit can be supplied with speed reducers at both ends, thereby giving opposite shaft speeds alike or different from each other. Through the selection of gears, ratios and motor speeds almost any requirement can be met.

Production Equipment Company, 5213 Windsor St., Cleveland, Ohio. April 14, page 604.

Worm-Gear Reduction Unit

Designed to transmit up to $7\frac{1}{2}$ hp., the capacity depending on the reduction ratio and worm speed, this worm-gear reduction unit is available in both horizontal and vertical types. The horizontal units are built with the worm below or above the gear, and in the vertical units the gear shaft may extend upward or downward. The worm and its shaft are made from a single nickel-alloy steel forging.

All shafts are in anti-friction bearings, and the worm thread is of the automotive type, with a high-pressure angle. A range of nine standard ratios, varying

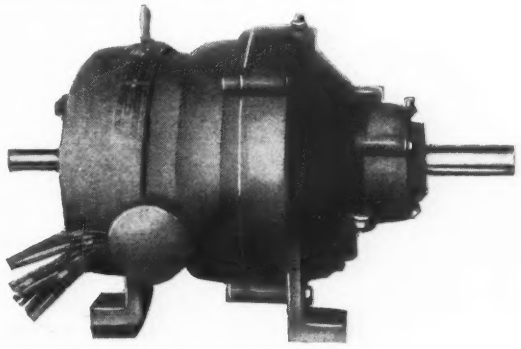
from $4\frac{5}{8}$:1 to 60:1 and a list of fifteen special ratios are available.

Cleveland Worm & Gear Company, 3258 East 80th St., Cleveland, Ohio. Jan. 26, 1932, page 147.

Hard Bronze for Bushings and Bearings

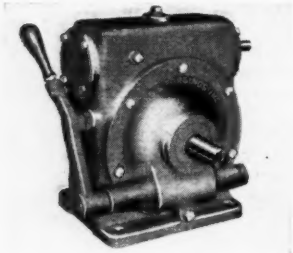
Bushings and bearings made of a hard, low-friction, phosphor-bronze alloy are offered for applications where hardness and ability to withstand pounding are particularly essential, together with the low friction and minimum wear assured by a leaded phosphor-bronze alloy. The lead content may vary from 5 to 25 per cent, depending upon the type of service required.

Bunting Brass & Bronze Company, Toledo, Ohio. June 16, page 971.



Two-Speed Worm-Gear Reducer

This type of speed reducer is manufactured integral with motor or as a separate reduction unit, in speed-reduction ratios ranging from 4:1 to 150:1. The two speeds are ob-



tained by means of the differential gearing. The high speed is obtained by moving the small hand lever to the right. This locks the differential to the low-speed shaft, on which the worm gear and differential gearing rotate as one unit. Movement of hand lever to the left locks the side gear of the differential, preventing its rotation. Thus one-half of the revolutions of the worm gear are imparted to the slow-speed shaft.

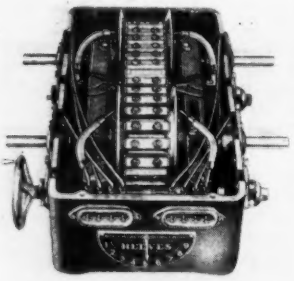
Gears & Forgings, Inc., 3134 Woodhill Road, Cleveland, Ohio. Dec. 1, page 809.

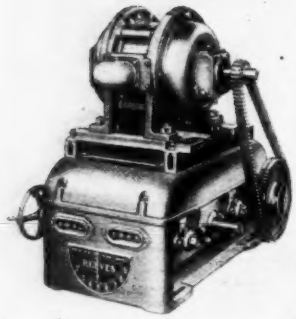
Inclosed-Design Variable-Speed Transmission

Ready access to the internal operating parts of the Reeves inclosed-design variable-speed transmission is provided by U-shaped recesses on the sides of the bottom sections of the case, which permits of the removal, as a unit, of the operating parts. Provision is made for the lubrication of all bearings by means of force-feed fittings in the recessed panels at one end of the transmission. From these fittings rigid copper tubes lead to the four radial shaft bearings and flexible leads to the four thrust bearings at the disk hubs.

Built in six sizes covering requirements from fractional to 10-hp. in all speed ranges, this unit can be mounted on the floor, ceiling or in a vertical position, as the requirements of the installation demand.

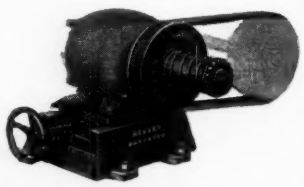
Reeves Pulley Company, Columbus, Ind. April 7, page 568.

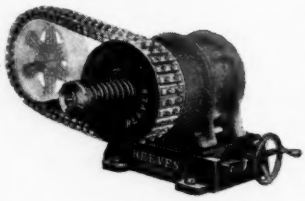




Vari-Speed Motor Pulley

The "Vari-Speed" pulley is an assembly of two opposing cone-faced disks, one stationary and one sliding, and an adjust-





able power compression spring, all of which is mounted on the motor shaft. The motor is mounted on a special base fitted with an adjusting handwheel by means of which the motor may be moved forward or backward. A specially constructed rubber belting is used on the smaller unit and double-block center-pull V-belt of cord construction on the larger unit. Variations in the speed of the driven pulley are obtained by simply turning the handwheel, moving the motor closer or farther away from the driven pulley. The smaller capacity pulley is ⅓ to 1 hp., and the larger one 1 to 7½ hp. The speed ratio is 3 to 1.

Reeves Pulley Company, Columbus, Ind. Sept. 29, page 476.

Vertical Bevel-Gear Speed Reducer

Spiral bevel gears of chrome nickel with improved tooth form, providing more teeth in

constant contact and a greater tooth bearing or pressure area, are used in this vertical-type speed reducer. Roller bearings are provided on both drive and driven shafts.

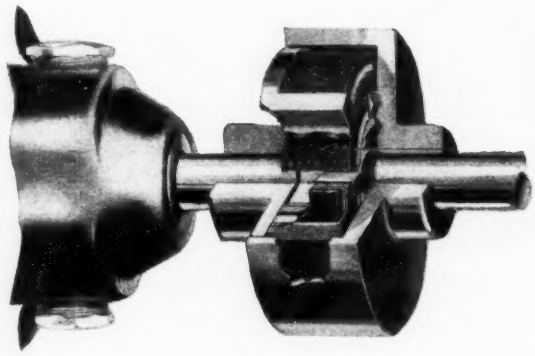
Where large ratios of reduction are required, this type of reducer is made integral with a planetary reduction unit so that all ratios from 8 to 1 to 1,600 to 1 are available. They are made in sizes from ½ to 100 horsepower.

D. O. James Manufacturing Company, 1114 West Monroe St., Chicago, Ill. Aug. 11, page 215.

Automatic Starter and Flexible Coupling

Between the two members of the Rawson automatic starter and flexible coupling are inserted floating segments made of brake lining reinforced with lead, a sufficient amount of lead being used to give the required pressure on the friction surfaces for carrying the load.

Upon application of power to the driving shaft, centrifugal force causes the outer, or starting, set of linings to press outward against the driven member. There is sufficient lag, however, to allow the driving member to attain practically full speed before the centrifugal

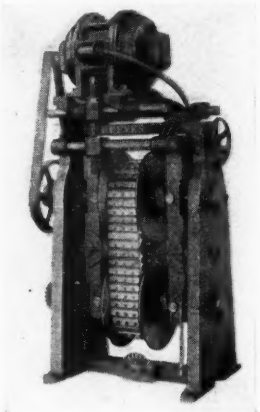


pressure takes effect. The starter will operate in either a horizontal or vertical position or in either direction of rotation, and can be arranged for direct connection as shown, or for gear, chain, V-belt or flat-belt drives. Sizes range from 3 to 300 horsepower.

Washburn shops of Worcester Polytechnic Institute, Worcester, Mass. May 5, page 719.

Transmission With Pivoting Motor Base

Built to meet requirements of limited floor space, the vertical Reeves transmission is now available equipped with a motor base which is adjustable vertically, in order that any stretch in the chain or multiple V-belt drive can be taken up. Adjustment is made by a manually operated screw. Lateral adjust-



ment of the motor rails to accommodate different sizes and types of electric motors is also possible.

Reeves Pulley Company, Columbus, Ind. Nov. 17, page 723.

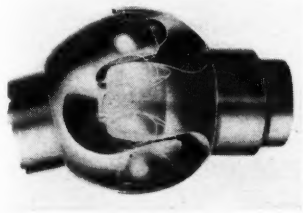
Pulley Covering to Reduce Slippage

Gripwell is a special compound and is used in connection with a treated canvas, producing a covering which when applied to a cast-iron, steel or wood pulley is said to produce a semi-elastic, gripping surface which reduces belt slippage. The compound contains preservative properties which penetrate the pores of the belt and tend to keep it in a pliable and healthy condition. Its use permits less tension on the belt than is the general practice.

Gripwell Manufacturing Company, 110 West 34th St., New York City. June 16, page 971.

Universal Joint for Industrial Drives

An important feature of the Weiss universal joint is that it overcomes the angular velocity fluctuation common to most types of universal joints. The constant-velocity factor depends upon maintaining the plane of driving engagement between the two yokes at half the shaft

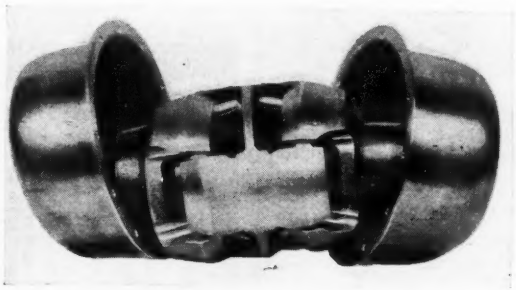


angle. This is accomplished by placing a number of steel balls, 4, 6, 8 or more, in intersecting races cut in the two joint members. The races guide the balls to one-half of the shaft angles.

Weiss Engineering Corporation, Grand Central Terminal Building, New York City. March 31, page 531.

Universal-Joint Coupling

Embodying the features characteristic of the Weiss universal joint, this coupling is adaptable to a wide range of applications. Steel balls provide the power-transmitting medium between the members, and allow for angular and parallel misalignment. With the type of housing shown, the maximum angularity obtainable on the shafts is 12 deg. and the maximum amount of misalign-



ment and maximum end motion is $\frac{1}{2}$ inch.

Weiss Engineering Corporation, Grand Central Terminal Building, New York City. April 14, page 603.

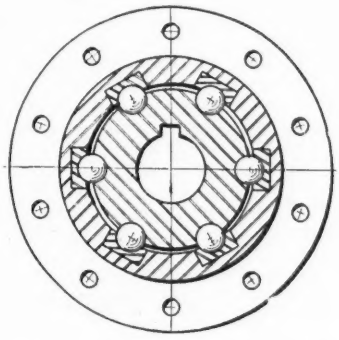
Small Couplings for Industrial Drives

Made in two sizes with maximum bores of $\frac{3}{4}$ in. and 1 in., respectively, the general design and kinematic action of the small couplings comprising this

line are the same as the larger couplings manufactured by the company.

The flange sections of the couplings are die-cast, with two jaws between which the floating center member slides, as shown. The floating center member is a solid, non-metallic, self-lubricating piece and transmits the torque between the flange sections. Both sizes permit a maximum parallel misalignment of $\frac{1}{64}$ in. and a maximum angular misalignment of 1 degree.

American Flexible Coupling Company, Erie, Pa. Jan. 19, 1932, page 111.



Flexible Coupling of Ball and Socket Design

Hardened and ground socket keys sliding in keyways cut in the outer rings fit over balls imbedded in the hub and permit the Davis coupling to compensate for off-set and misalignment.

The outer ring connects the two hubs through the socket keys sliding endwise in the ring and rocking over the imbedded balls in the hub. With this construction practically half of the area of the balls is always in contact in the socket keys. This provides maximum driving contact in all positions and at the same time provides free lateral float to the connected machines.

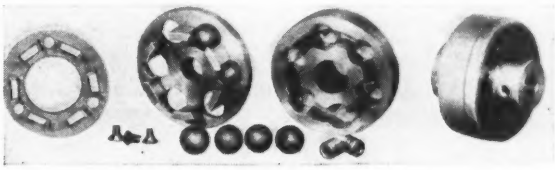
Penn Machine Company, Johnstown, Pa. Nov. 10, page 688.

Coupling With Rubber Balls as Flexible Member

Torsional resilience is provided in the Edmunds flexible coupling by the use of rubber balls. The flange half has six cylindrical pockets, all parallel to the shaft, and a circular groove in the spaces between the pockets. The other half has six projecting lugs between which are placed the rubber balls. The balls occupy the pockets in the flange and the lugs on the spider occupy the groove. By removing the rubber balls the motor or other driving mechanism can be disconnected from the load for testing or other purposes.

The coupling is made in a range of shaft sizes from the No. 4 with a $\frac{1}{2}$-in. bore to the No. 31 with a $3\frac{7}{8}$-in. bore. The first will transmit $\frac{1}{8}$ hp. per 100 r.p.m., and the second 35 hp. per 100 r.p.m.

Crocker Wheeler Electric Manufacturing Company, Ampere, N. J. April 28, page 678.



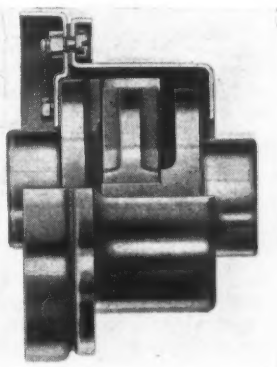
Oil-Circulating Shaft Bearing

In the Robins-Jones bearing oil is drawn up from the well in the base through a series of parallel holes or ducts in the bearing surface by the rotation of the shaft and distributed over the bearing surface in either direction of rotation. The range of speed to which the bearing is adaptable is from 1 to 5,000 r.p.m. and the load or pressure may be applied to either halves of the bearing. It may also be applied to vertical as well as horizontal shafts by proper arrangement of the oil well and oil ducts to the bearing surface. The bearings are available as separate pillow blocks, or they may be obtained specially designed as a built-in unit of the machine.

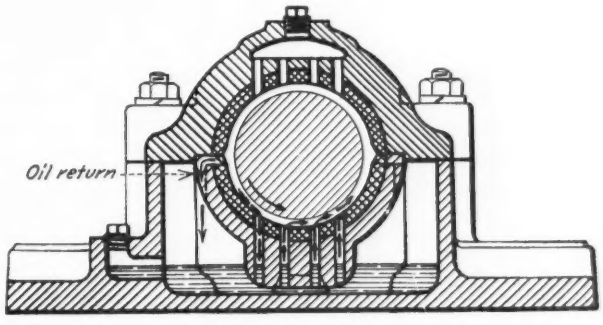
Robins Conveying Belt Company, 15 Park Row, New York City. May 19, page 792.

Inclosed and Lubricated Cross-Type Coupling

The Francke cross-type coupling will take care of shaft misalignment up to $\frac{1}{16}$ in. and is suitable for drives where spring cushion for load shocks is not



essential. It consists of four parts, two hubs, a cross and a pressed-steel grease cover. The coupling is available in four sizes, with maximum bore diameters from $1\frac{1}{4}$ to $1\frac{7}{8}$ in. and with rating of $1\frac{1}{2}$ to $7\frac{1}{2}$ hp. at



850 r.p.m., 2 to 10 hp. at 150 r.p.m. and 3 to 15 hp. at 1,750 revolutions per minute.

Smith & Serrell, 1 Halsey St., Newark, N. J. March 17, page 459.

Bearing Clearance Compensator

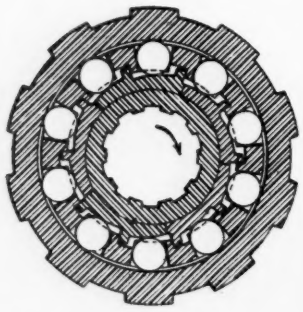
By taking up play in bearings as it occurs, this compensator prolongs the useful life of the bearings and of reciprocating parts. Two mating helical cam-faced members serve the space-filling requirements which are necessary as wear occurs. A spring provides the power to rotate the cammed members whenever this action is required. The principle of automatic adjustment is also embodied in designs suitable for use on connecting rod, sliding and other types of bearings.

Wyrick Engineering Company, Wyandotte, Mich. March 31, page 530.

Roller Clutch-Type Bearing

Adaptable to practically all types of equipment and designed to take the place of the usual ratchet or backstop, the Weiss roller clutch bearing gives a clutching action in one direction of rotation and free rotation in the opposite direction. The rollers are uniformly spaced by a ring having lugs which contact with lugs on the locking ring.

With the inner member rotating in one direction it operates as a standard roller or ball bearing; but when the rotation is reversed the rollers roll up on the inclined surfaces and

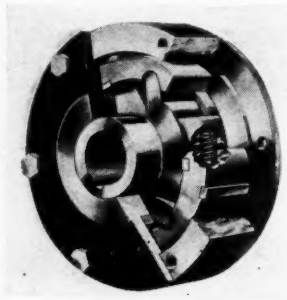


bind between the inner and outer rings to effect a driving engagement between the two members.

Weiss Engineering Company, Grand Central Terminal Bldg., New York City. Aug. 4, page 178.

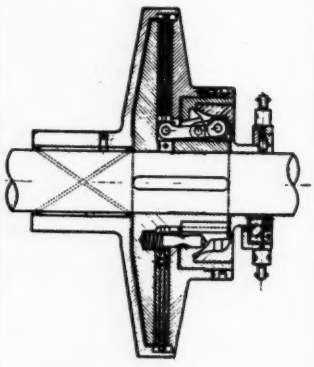
One-Way Positive Clutch

A central forged-steel hub on either side of which are two hardened and ground steel races, a hardened and ground outer steel race and three shoes constitute the Pitter clutch. Light helical coil springs keep these shoes always in position for gripping, but take no part in the drive. If the spindle is rotated in the driving direction the shoes lock against the inner and outer races, thus giving



positive lock. Intended to replace ratchets, "no-backs," and over-running couplings, the clutch is particularly designed for converting alternating motion, either reciprocating or rotary, into one-way movement. Sizes range from $\frac{1}{2}$ to 4-in.

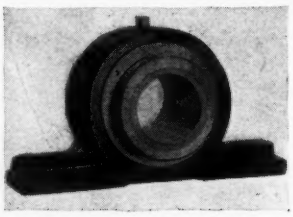
Universal Gear Corporation, 327 South La Salle St., Chicago, Ill. March 31, page 529.



Completely Inclosed Friction Clutch

In both the engaged and disengaged positions this clutch is fully inclosed. It consists of a laterally free-friction disk capable of being clamped between two heavy steel disks, one of which is keyed to the central shaft. Compression of the disk between the clutch faces is by three toggle members actuated by an internal cam of cylindrical form, which is moved lengthwise on the shaft by a slip ring and shifting yoke.

Dodge Manufacturing Corporation, Mishawaka, Ind. July 14, page 67.



Self-Aligning Roller Bearings

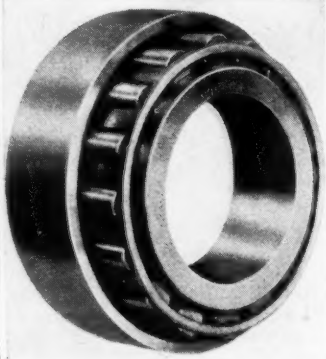
Double-row self-aligning roller bearings as used in the standard-duty units are now available in these lighter-weight simple housings in a full range of shaft sizes from $\frac{3}{4}$ to 3 inches. Sealing of the normal-duty unit is accomplished by a grease seal consisting of two steel stampings pressed into the housing or cover. Between these stampings is a $\frac{3}{32}$-in. fiber washer. The new take-up units are suitable for conveyor work or any normal-duty applications where a belt take-up bearing is required. The flange units can be mounted on a cast-iron frame without machining and can also be used as a step bearing for vertical shafts.

Shafer Bearing Corporation, 6501 West Grand Ave., Chicago, Ill. Sept. 29, page 475.

Radial Roller Bearings

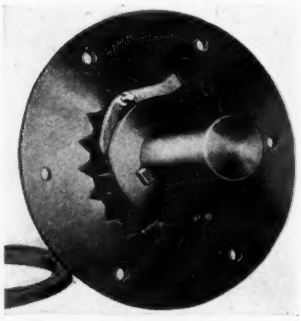
This line of radial roller bearings includes CR-200, CR-300 and CR-400 series for light, medium and heavy duty, comprising 64 bearings ranging from $1\frac{3}{16}$ to $10\frac{7}{16}$ in. in outside diameter. The bearings are standardized and interchangeable with other makes and types of bearings as to inside and outside diameters. The outer race is free from lips or shoulders, but the inner race has a double lip. This construction permits the rollers to move longitudinally across the face of the outer race, thus providing for expansion and contraction of the shaft without cramping.

Aetna Ball Bearing Manufacturing Company, 4600 Schubert Ave., Chicago, Ill. Oct. 6, page 513.



Backstop Prevents Shaft Reversal

The Landahl backstop serves not only as a positive means of preventing shaft reversal, but also as a bearing. Its internal construction consists of two



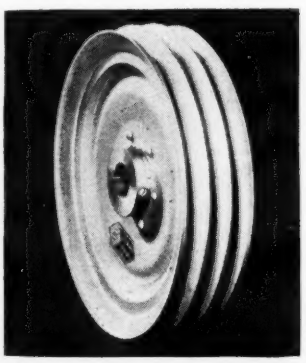
locking pawls mounted on pins held by two floating rings and a pawl collar.

This pawl collar is shaped so that the pawls do not engage the ratchet as long as the shaft is traveling in the correct direction, but lock in the ratchet immediately the shaft direction reverses. The pawls engage and disengage without rubbing the ratchet, and all working parts rotate in an oil bath. Two styles are available.

Fairfield Engineering Company, Marion, Ohio. May 12, page 754.

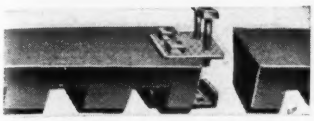
Light-Weight Steel Sheaves for V-Belt Drives

Pressed-steel sheaves and complete Texrope drives using these sheaves are now available.



The sheaves are die-pressed and then each section is welded both at the web and at the rim to eliminate vibration and noise and to give accurate balance. They are manufactured in a large range of diameters, permitting ratios as high as 6 to 1.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Sept. 29, page 477.



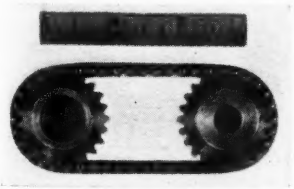
Link-Wedge Belt

This link wedge belt consists of rubber and fabric with integral cogs on the inside. It is adapted to run on a standard V-shaped pulley. The belts are made in large sheets and can be cut to the desired width and length. A metal clamp is used to join the ends.

Dayton Rubber Manufacturing Company, Dayton, Ohio. Aug. 4, page 179.

Silent Chain of 3/16-In. Pitch

Made in three types, middle-guide, side-flanged and duplex, this $\frac{3}{16}$-in. pitch silent chain provides a flexible drive for fractional-horsepower motors and small units. The middle-

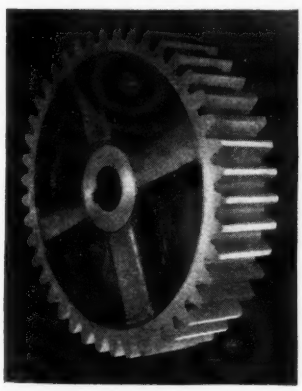


guide and side-flanged chains are used where all shafts are driven in one direction, and the duplex chain for reverse direction.

Link-Belt Company, 910 South Michigan Ave., Chicago, Ill. Dec. 22, page 912.

Welded Steel Gears

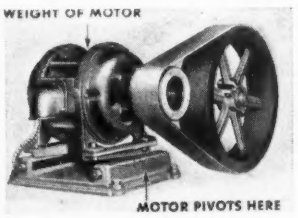
Ranging in diameters from 15 to 168 in. and especially adapted to heavy-duty service, these gears are made from rolled steel sheet. A solid steel disk forms the web of the gear, against which channel-shaped steel arms are welded. The hub is a forged-steel bar drilled to receive the shaft. The entire line, including spur, helical, herringbone, bevel, internal, spiral and continuous-herringbone gears, is now available in welded-steel construction.



Philadelphia Gear Works, Erie Ave. and 9th St., Philadelphia, Pa. Sept. 29, page 477.

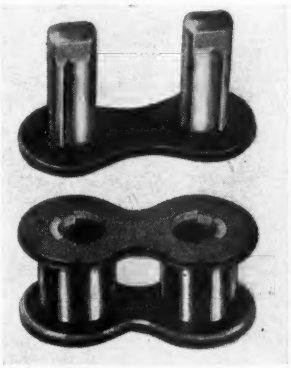
Short-Center Flat-Belt Drive

A standard Rockwood short-center drive in six sizes is now available to cover all require-



ments for motors from 1 to 50 hp. at 1,800 r.p.m. The standard bases provide simple adjustments for motor size, pulley alignment and belt length, and the design eliminates the need for the usual motor rails. Uniform belt tension is obtained by mounting the motor on a pivot, the overhang of the motor giving sufficient weight to maintain proper belt tension.

Rockwood Manufacturing Company, Indianapolis, Ind. March 24, page 493.



Improved Roller Chain

Within the roller used in this chain there are two joint members, a segmental bushing and a pin. The cross-section of the pin is that of a round pin integral with a segmental bushing. Because of this construction, when a chain is flexing on or off a sprocket, all sliding movement of surfaces under load is between the pin and its bushing, and no movement occurs between the roller and the joint members when under load.

The chain is made in single, double, triple and quadruple designs and is interchangeable on all standard roller sprockets.

Morse Chain Company, Ithaca, N. Y. Jan. 12, 1932, page 77.

Meters, Recorders and Testing Instruments

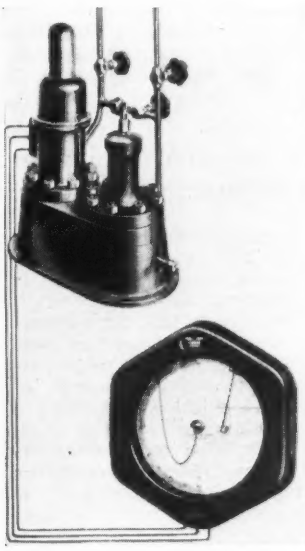
Recent developments in flow meters, pyrometers, recorders for temperature, pressure, condenser leakage, specific gravity and absolute pressure, water-level indicators, smoke meters, comparators for pH determination and instruments for testing feedwater and calcium chloride brine

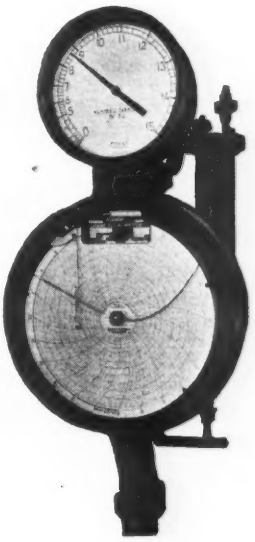
Electrically Operated Oriflo Meter

Type EB oriflo meter depends for its operation upon electrical balancing of two similar circuits. Any changes in the rate of flow cause the rise or fall of the mercury and a corresponding movement on the float in the pressure element. At each movement of the float an attached core moves within divided primary coils, which are connected to a source of alternating current. The movement of the core within the coils unbalances the circuit and causes the rotor of the self-synchronizing motor to take a position that will again balance the circuit.

In the mercury unit, which is designed for a pressure of 900 lb. gage, the electrical circuit is completely isolated from the mercury as well as from the fluid metered. The flow indicator has an illuminated scale 8 in. long with black graduations. The instrument is suitable for use on steam, air, gas and water.

Builders Iron Foundry, Providence, R. I. Dec. 29, page 949.





Combination Flow Meter

This combined recording, integrating and indicating flow meter, designed especially for use on processes, has an 8-in. indicating scale mounted directly over the recorder case. The dial of the indicating instrument has a long, open, concentric scale, plain tapered pointer, and block numbers. It can also be supplied with a recording integrator which makes a record of the total flow.

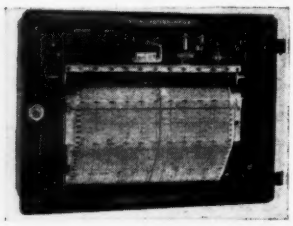
Foxboro Company, Foxboro, Mass. Aug. 4, page 179.

Potentiometer Pyrometer

In the Null-type potentiometer a galvanometer directs the operation of the mechanism to rebalance the circuit for each change in electromotive force that is measured. The charts and scales are made to conform to the latest calibration values for Iron-Constantan,

Chromel-Alumel, and Platinum-Rhodium thermocouples, and a humidity compensator is built into the instrument to correct automatically the pen position and bring it into proper register with respect to the chart markings.

Automatic control is obtained through mercury switches



which can handle up to 50 amp. at 220 volts (60 amp. at 110 volts). The instrument may be provided with as many as three mercury switches,

Brown Instrument Company, 4496 Wayne Ave., Philadelphia, Pa. July 28, page 140.

Thermometer Gives True Bulb Temperatures

Freedom from the effect of ambient temperatures (case and tubing temperatures) are claimed for this recording thermometer which is designed to give true bulb temperatures between 0 and 250 deg. at all times irrespective of variations in surrounding temperatures. It contains no cams, compensating levers or bi-metallic strips.

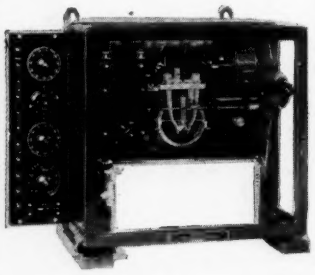
A special construction feature is found in the small bulb. The thermometer is so designed that it can make use of a sensitive bulb as small as one inch long.

Foxboro Company, Foxboro, Mass. Dec. 15, page 877.

Automatic Recorder for Condenser Leakage

The electrolytic conductance method employed with this condenser-leakage recorder depends for its operation on the fact that salts in solution in water are ionized to a greater or lesser extent and therefore the solution becomes electrically conducting to a greater or lesser degree, depending on the salt concentration and the degree of ionization. The recorder circuit consists of a balanced Wheatstone bridge operated from alternating current, according to the method usually employed for electrolytic conductivity measurements.

Three conductivity cells are used: to measure the conductance of the condensate in the hot well, the conductance of the



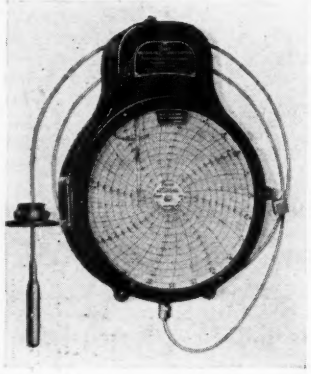
distillate or condensed steam taken from the turbine, with no opportunity for condenser leakage and the conductance of an artificially prepared mixture of distillate and cooling water. These cells are connected to a switch so that any one of them can be connected into the bridge circuit by proper setting of the switch.

The conductivity cells used are of the usual type, consisting of metal electrodes of definite area spaced a fixed distance apart. The recorder can be modified to permit the sounding of an alarm bell when the leakage exceeds a prescribed limit.

Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa. Dec. 29, page 949.

Compensated Tubing for Temperature Recorders

A type of capillary tubing in which the compensating qualities have been incorporated in the material of the tube itself is used with this temperature recorder. The volume of mercury in the tubing is so proportioned to its coefficient of expansion and to the size of the alloy wire that any change in the volume of mercury resulting from external temperature changes is compensated. The adjustment is made for each varying exposure. Welded joints

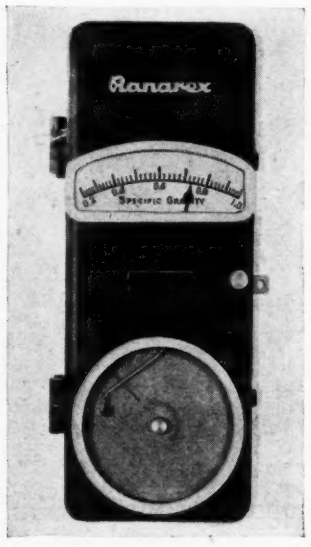


are used on the tubing and the bulb is machined alloy steel.

Taylor Instrument Companies, Rochester, N. Y. April 21, page 642.

Specific Gravity Indicator and Recorder

Simplified and more compact design features this model of the Ranarex gravity recorder. The indicating and recording mechanism is attached to one plate and the driving mechanism, including the motor, to another. The humidifier is an integral part of the machines, and the



passages connecting the humidifier compartments and the measuring chambers are cast into the body and rear chamber door.

The standard scale on the new model machine is graduated from 0.2 to 1.0 specific gravity in place of the 0.35 to 1.0 range on the strip chart model. The scale is 9 in. wide and the circular charts are 8 in. in diameter. The recording mechanism is driven by either a spring clock or an electric clock.

Permutit Company, 440 4th Ave., New York City. Oct. 27, page 618.

Ratio Meter for Gas and Oil Firing

Use as a combustion guide in the firing of gas or oil-fired heaters and all types of industrial furnaces is the function of this ratio meter, which is equipped with two recording pens. One records the rate of oil flow and is actuated by a simple mechanical type of mechanism which receives its motive power from the differential pressure in the fuel line.

In addition, the meter records and indicates the rate of flow, and the total flow may be given by the four-dial integra-

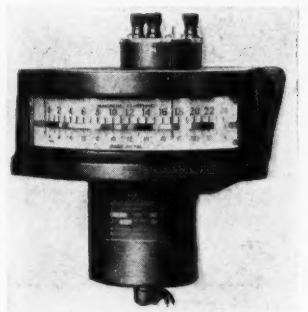
tor. It is also possible to install auxiliary recorders of temperature or pressure in the meter to give records of these factors on the same chart with the flow records.

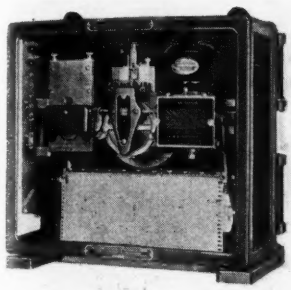
Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. Sept. 8, page 370.

Improved Indicating Pyrometer Control

In the redesigned Tycos indicating pyrometer control the weight of the instrument has been decreased by 3 lb., and the new model is faster in operation. The back panel has been eliminated, and this simplifies wiring and makes the instrument easier to install.

Taylor Instrument Companies, Rochester, N. Y. May 5, page 719.





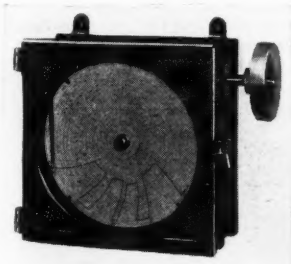
Improved Potentiometer Pyrometer

The name "Micromax" distinguishes this improved potentiometer pyrometer from the preceding models. Greater sensitiveness, faster operation and full automatic operation are obtained by the use of a new mechanical balancing device and an automatic standardizer which checks the instrument every 45 min. or less. Also, the circuit can be standardized at will (as after changing a thermocouple, when a check is desired) before the 45-min. cycle is completed. Recorders now in operation may be equipped with Micromax improvements.

Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa. Sept. 29, page 476.

Operation Recorder

To record automatically the time of operation and shutdown of a machine or unit is the purpose of this instrument. Its applications include recording the operating regularity of turbines and the correctness of the overspeed or safety trip, the recording of the rate and regularity of coal feed on stokers and speed of fans where the speed controls the amount of air delivered to the furnace, as well as a number of other uses. Standard clock movement is used to drive the chart, giving a 12- or 24-hr. record. The instrument is available with drive on either side or back as desired and for use with either belt, coupling or flexible-shaft connection. It can be operated in either direction.



Amthor Testing Instrument, Inc., 309 Johnson St., Brooklyn, N. Y. Oct. 20, page 583.

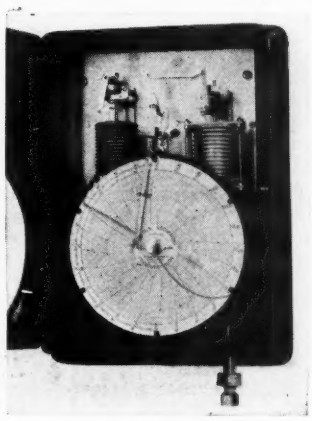
Selsyn-Operated Pressure Gage

A power-type pressure device used with this Selsyn-operated remote indicating pressure gage is connected to the pressure to be indicated or recorded. When the applied pressure increases or decreases, the power pressure device functions to operate a Selsyn motor. As the driven Selsyn assumes a definite position for each pressure so does one or more Selsyn-operated indicators and recorders to which it is connected; hence it is possible to secure remote indications or records of the desired pressure. The power pressure unit can be furnished for practically any maximum pressure, and also for a large suppression. The indicator permits of a total pressure range of only 30 lb. for an average operating pressure of 400 lb. Twelve or more indicators or recorders can be connected in the same master pressure circuit.

Bailey Meter Company, 1034 Ivanhoe Road, Cleveland, Ohio. April 7, page 567.

Recording Absolute Pressure Gage

Designed to obviate the necessity of applying barometric corrections to vacuum readings in connection with operation of turbine condensers and similar uses, this direct-reading single-pen absolute pressure gage has two extremely sensitive diaphragm elements. One is connected to the vacuum line and the other is directly affected by barometric pressure variations. The resulting movements of these elements are transmitted by a differential linkage to a single penarm.



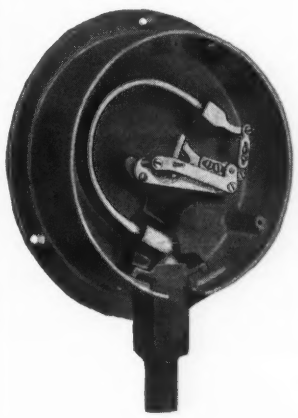
The instrument can be furnished for ranges as low as from 0 to 50 mm. (0 to 2 in.) head of mercury pressure, absolute or equivalent.

Bristol Company, Waterbury, Conn. Jan. 12, 1932, page 75.

All-Steel Gage for Severe Service

Designed especially for service where rapidly pulsating pressures and vibrations are encountered, this all-steel gage is said to be unaffected by many chemicals and fumes which ordinarily attack bronze, such as sulphur and ammonia.

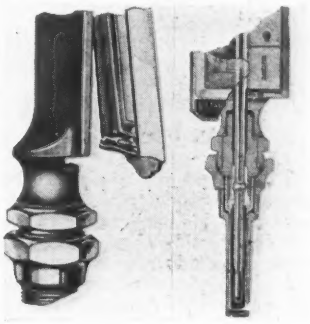
The pressure tube is machined from a solid bar of special alloy steel. The tube is rolled to shape and radius, heat-treated and tempered. The movement is entirely of steel and the bearings are of stainless steel.



Crosby Steam Gage & Valve Company, 10 Roland St., Boston, Mass. Nov. 3, page 655.

Snap-Case-Front Thermometer

A tongue at the top of the case fits snugly in a groove in the front so that in either opening or closing the front of this meter it cannot slip and fall. Other features include connecting piece locked to case by a specially designed washer; asbestos packing compressed around enlargement on glass stem, preventing movement of the tube with reference to scale; monel bulb chamber thin enough to allow quick conductivity, yet strong and non-corrosive; left-hand thread on bulb chamber prevents loosening if case is turned in removing thermometer from socket; and mercury filling in bulb chamber, insuring rapid transmission of heat.

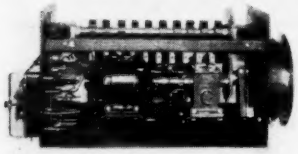


C. J. Tagliabue Manufacturing Company, Park and Nostrand Aves., Brooklyn, N. Y. July 7, page 32.

Automatic Combustion Indicator

This instrument is designed to provide continuous indication of CO_2 only; CO_2 and furnace draft; CO_2 furnace and uptake drafts; and CO_2, furnace draft and flue gas temperature. Using the orsat principle of operation, the instrument is similar in design to the standard Hays CO_2 recorder. The power unit for the draft attachment is the colon leather mechanism. The flue gas temperature indicator, operating on the thermo-electric principle, is similar to the mechanism used in the portable combustion test set.

Hays Corporation, 1042 East Eighth St., Michigan City, Ind. Dec. 22, page 913.



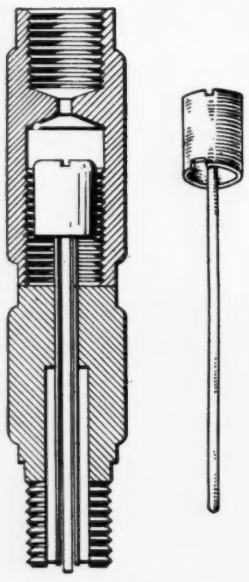
Multi-Contact-Making Pressure Gage

Ten adjustable contacts are placed at predetermined intervals over the scale of this pressure gage. When the pressure changes sufficiently to make a new contact, a code of impulses is sent over the supervisory control wires to indicate the change. The device consists of motor-driven contacts which are made to follow the pressure gage. To accomplish this the shaft of the pressure gage is extended through to the rear. The indicating contacts have a capacity of 5 amp. at 125 volts.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Oct. 13, page 546.

Vibration Eliminator for Pressure Gages

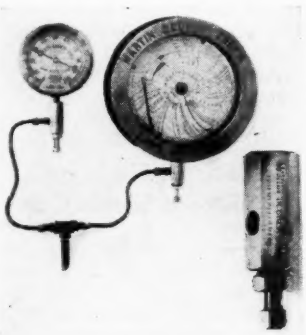
In a recess in the body of this pressure snubber, which is designed to eliminate vibration of gage pointers, a traveling clearing pin is permitted to float,



being guided by a stem sliding in an oversize orifice. At each pulsation of the flow the clearing pin rises and falls within the tubular orifice. This movement tends to absorb the pulsation and to keep the orifice clear.

Two additional traveling clearing pins of different sizes are supplied with each snubber to take care of unusual conditions. The standard snubber can be used for air, water, steam, oil, etc. For liquids and gases that have a corrosive action on bronze, a stainless steel snubber has been made available. It is made in ¼-in. size and for pressure up to 2,000 pounds.

Ray Pressure Snubber Company, 311 East Fifth St., Charlotte, N. C. Feb. 17, page 309.



Gage Pulsation Dampener

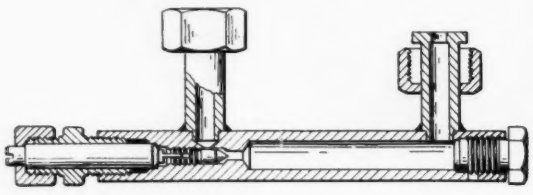
Suitable for use on air, gas, oil, water, steam or gasoline, this dampener is adjustable in one size for any pulsating pressure from a few inches of water to several thousand pounds. It can be applied to indicating and recording gages, on orifice meters, draft gages, low-pressure manometers and other types of pressure-measuring instruments. It is made in two models, brass body with stainless-steel stem and all-stainless-steel.

Martin-Decker Corporation, 3431 Cherry Ave., Long Beach, Calif. Oct. 20, page 582.

Damping U-Tube for Flow Meters

This U-tube for use on the new-style Foxboro flow meters and flow controllers can be adjusted for proper damping while the instrument is in operation. A screwdriver extending through a packing gland is fitted to the end of a needle valve. By turning the screwdriver at its outer end adjustments can be made in the damping without the mercury being forced out.

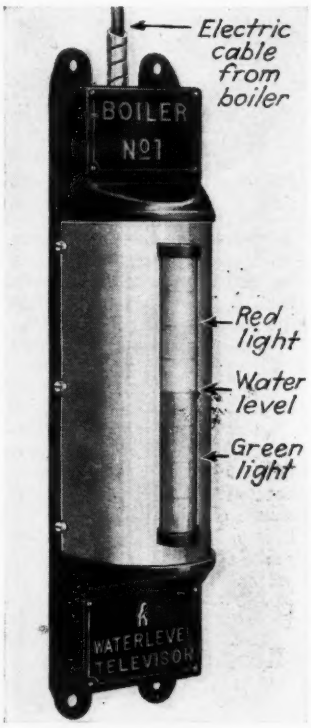
Foxboro Company, Foxboro, Mass. Feb. 3, page 202.



Water-Level Televisor

Consisting of three units, transmitter, distributor and indicator, the televisor affords a means of indicating at one or more distant points the water level in a steam boiler, tank or other vessel. The transmitter, containing a set of electrodes that make contact with the boiler water, is connected to the boiler drum or tank. The electrode assembly is connected by multiple-wire cable to a distributor containing a transformer and a set of relays of the magnet-coil, double-pole, mercury-contact type.

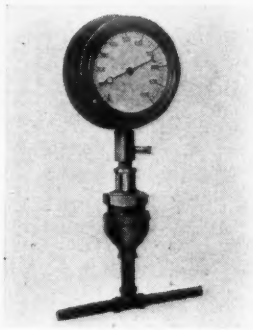
The indicator contains two vertical rows of small lamps, the right-hand set illuminating a green glass, the left-hand set a red glass. The colored light reflected from these lamps shows



in a long prism on the front of the indicator. A separate transmitter and distributor is used for each boiler, but any number of indicators may be connected to one distributor.

Televisors suitable for use on closed feed-water tanks and open water supply tanks are also available.

Schutte & Koerting Company, 1150 Thompson St., Philadelphia, Pa. Sept. 1, page 338.



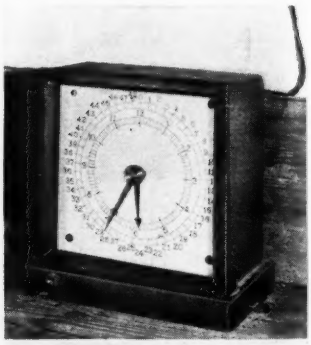
Gage Protector and Non-Pulsator

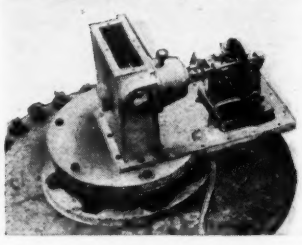
The gage illustrated is equipped with a fitting, termed a non-pulsator, designed to remove all pulsation in the gage movement by restricting the fluid passage, the restriction being effecetd by means of a needle valve. Directly below this is another fitting called a gage protector; a bronze-bodied rubber-bulbed pressure-transmitting unit is used to transmit line pressure by means of a secondary or bulb pressure. The body of the protector is made of a special anti-corrosive bronze.

Champion & Barber, 576 Subway Terminal Bldg., Los Angeles, Calif. Aug. 4, page 178.

Fluid-Level Indicator

As the two units (the transmitter and the indicator) of the MacCreedy fluid-level indicator are connected electrically only, they may be placed any distance apart. The transmitting system generally is placed on the top of the liquid tank, the housing inclosing the transmitter being mounted directly on the manhole cover.



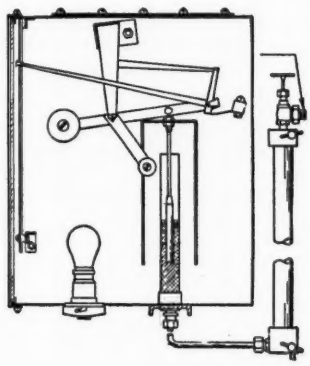


Indicators are furnished for shelf or panel mounting. The dial is of porcelain and is graduated in feet, inches and one-eighth inches. The electrical connections between the two consist of only two wires. The system can be applied to the floating-roof type of tanks as well as to practically all other types of tanks.

J. H. Bunnell & Company, 215 Fulton St., New York City. Feb. 17, page 308.

Liquid-Level Gage

In this liquid-level gage for elevated tanks a mercury U-column is used to measure directly the liquid head or static pressure. One leg of the U-column terminates in an indicating pointer gage. Scales read directly in feet or in fractional levels between full and empty tank, as specified. It can



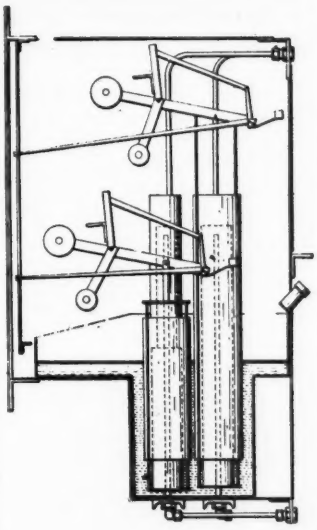
be furnished in multiple units for two or more tanks with the pointer movements in a common case and compact header arrangement of the mercury columns.

Ellison Draft Gage Company, 214 West Kinzie St., Chicago, Ill. Sept. 29, page 475.

Draft Gage for Zoned Air-Flow Control

To provide a compact gage with minimum space requirement, a tandem arrangement of differential elements has been made in this draft gage for zone control on underfeed stokers. Straight-line movements are arranged in pairs, with two rows of pointers in the unit, one above the other in the same casing and with the bells one in back of the other in the same oil pan. Scale centers are $2\frac{3}{4}$ in., or an equivalent space requirement of $1\frac{3}{8}$ in. width for each reading.

All bells are served by a common oil pan or reservoir provided with an oil filler in back of the gage. The scale for each pointer is 8 in. long, and scales may be furnished in

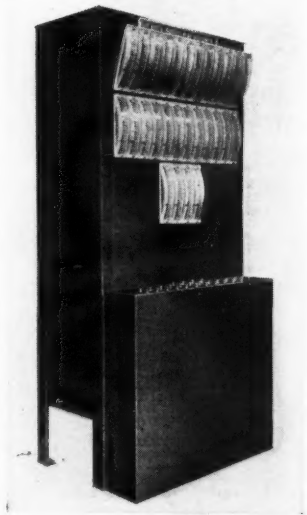


square-root graduations for direct indication of relative air flow, in uniformly spaced graduations, or graduated only at zero and full range.

Ellison Draft Gage Company, 214 West Kinzie St., Chicago, Ill. July 21, page 106.

Panel for Stoker Zone Control

For use with the zone-control on underfeed stokers, this panel has 28 specially designed dif-

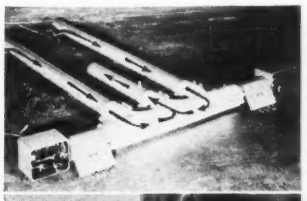


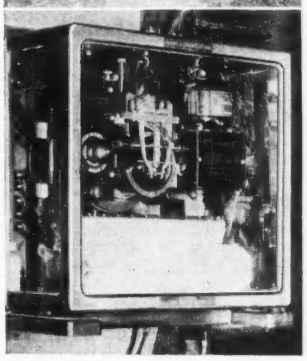
ferential-type draft gages. Other features are an airtight case and molded glass cover for each power unit, indicating pointers moving parallel to the scale faces and operating mechanism of the standard colon leather type. The board is also fitted with 28 zone damper buttons which give control of the primary air for combustion.

Hays Corporation, 1042 East Eighth St., Michigan City, Ind. Jan. 26, 1932, page 146.

Smoke-Density Recorder

This smoke-density recorder consists of a measuring chamber, a recorder and a boiler room indicator. The measuring chamber is installed in the stack or breeching, with sampling pipes extending into the smoke passage. Smoke is continuously drawn from the breeching by means of an aspirator. The measuring chamber contains a lamp at one end and a temperature-compensated thermopile at





the other. Heat radiated from the lamp passes through the smoke-filled chamber and falls on the thermopile, the amount of heat passed being inversely proportional to the density of the smoke. The instrument records the smoke density in per cent or Ringelmann chart numbers.

The boiler room indicator is a bank of five colored lamps, the color of the light burning indicating the smoke condition in the stack.

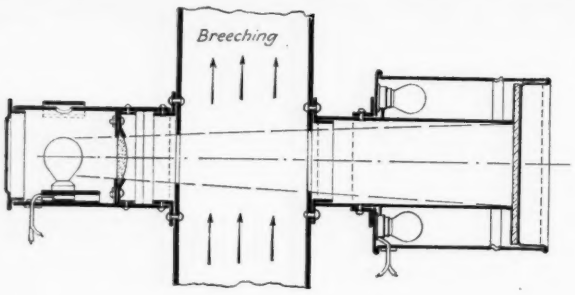
Leeds & Northrup Company, 4901 Stenton Ave., Philadelphia, Pa. April 7, page 568.

Pocket Size Smoke Comparator

Providing a simple and practical means of determining readily the quality of smoke, this pocket-size smoke meter, or comparator, consists of two celluloid disks $4\frac{3}{4}$ in. in diameter attached together at their centers so as to permit the rotation of one disk with relation to the other. The front disk of the meter is divided into five equal sectors, each of which has a definite grade of color, representing 20, 40, 60, 80 and 100 per cent of black, and numbered 1 to 5, respectively. The front disk is fitted with four slotted openings ($\frac{3}{16}$ x $1\frac{1}{4}$ in.) centered on the four division lines, while the rear disk, which is colored black, has only one opening of similar size and location. The meter is held at a comfortable distance from the eye so that the light falling upon it is the same as that striking the smoke.

The color of the smoke is observed by having the slot in the black disk in line with the eye and turning the front, or shaded, disk until the color of the smoke as seen through the slot matches with either of the adjacent colored sectors. This smoke meter is intended to supplement but not supersede the Ringelmann standard chart, upon which it is based.

POWER, *330 West 42d St., New York City. Jan. 19, 1932, page 113.*



Smoke-Density Indicator

In this smoke meter a beam of light is projected across the smoke passage to an indicator attached on the opposite side. Smoke particles in the beam cast shadows on the inner circle of the indicator, the density of the shadows varying with the amount of smoke. Around this central part of the indicator are illuminated sectors graduated in the Ringelmann scale of smoke density. The shadows on the center portion may be compared directly with these standard scales. A number of images from different boilers may be converged to a common mirror for central observation; or images from the same instrument may be reflected to different points. The shadow scale and smoke chart being on the same plane and illuminated permit of a wide angle of vision.

Sales Corporation, Richmond, Va. Sept. 1, page 338.

Smoke Indictor

The use of this instrument enables the fireman to see the actual smoke before it reaches the breeching and to know almost instantly which boiler is producing the smoke. A constant stream of flue gas is drawn through the instrument by a motor-driven suction fan

in the base section. Motors can be supplied for either 110 or 220 volts, alternating current, and an electrically operated alarm may also be added to the indicator.

C. D. McPherson, 5010 Duffield St., Frankford, Philadelphia, Pa. July 21, page 105.

Comparator Employs Colored Glass Standards

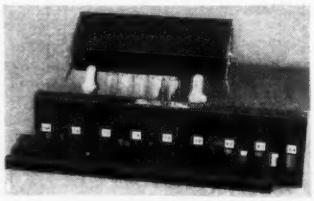
In place of using a set of blue standards from solutions containing known amounts of phosphate, colored glass standards are used in the Hagan comparator. This has simplified the process of determination to the point where speed and accuracy of analysis are now possible in the hands of the boiler operator himself.

A sample in a small glass cell is treated to develop the color, and this cell is placed on one side of the comparator. In the other side, in a similar cell, is placed another portion of the sample. Two beams of light entering the back of the comparator through a white glass plate, passing, one through the treated portion of the sample and the other through the compensating portion and colored glass standards, are brought into juxtaposition by a system of prisms. Color disks for pH determinations can be supplied.

Hagan Corporation, Bowman Bldg., Pittsburgh, Pa. April 28, page 679.

Instrument for Colorimetric pH Control

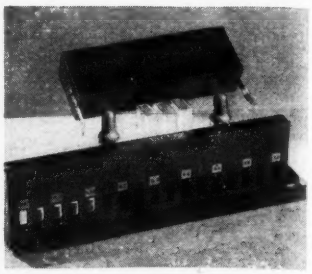
To make determinations with this slide comparator the top is removed from the base, three of the test tubes are filled to the mark (5 c.c) with the sample to be tested and placed in the three holes back of the slots in the base. To the central tube 0.5 c.c. of the indicator solution is added by means of the pipette and nipple, and the contents are thoroughly mixed.



The slide containing the color standards is then placed in position on the base, and, holding the instrument toward a window or other source of daylight, the slide is moved back and forth in front of the test samples until a color match is obtained. The pH is then read off directly from the values on the front of the slide.

Comparators are supplied to cover the pH range 0.2 to 13.6. Each comparator covers a range of 1.6 pH units, the standards being in intervals of 0.2 pH. A portable set covering a wide pH range has also been made available, in five models, to cover the range of any 3 to 7 indicators, respectively, between the limits of 0.2 and 13.6 pH. Each long range instrument contains one complete slide comparator, extra color-standard slides and vials of corresponding indicator solution with pipettes and nipples.

W. A. Taylor & Company, Inc., 872 Linden Ave., Baltimore, Md. March 24, page 493.



New Chlorine Comparator

In addition to the control of chlorine in water, sewage, industrial wastes, etc., the outfit illustrated is suitable for use in power plants where chlorine treatment is used to stop the growth of the algæ, etc., in condensers.

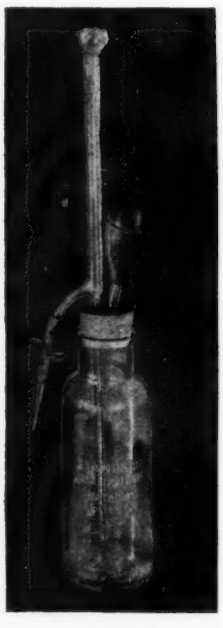
It consists of two principal parts—the slide and the base, and contains nine color standards, ranging from 0.0 to 1.0 p.p.m. of chlorine and eight ampoules of distilled water, the latter alternating with the color standards. The lower part of the base contains a slot in which the slide may be moved back and forth, and two holes containing vials of ortho tolidine and three holes containing molded Pyrex glass cells.

A determination of chlorine with this outfit consists of only three simple operations.

W. A. Taylor & Company, Inc., 872 Linden Ave., Baltimore, Md. Nov. 3, page 654.

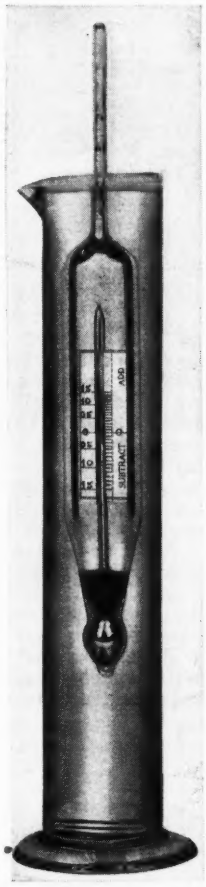
Self-Leveling Burette

The advantages of this improved self-leveling burette over the former model is its compactness and simplicity. It is



16½ in. high and the reservoir will hold 500 c.c. The reservoirs are marked for soap, acid and silver nitrate, the latter being a brown bottle to keep out light. The burette itself holds 10 c.c. and is standard equipment.

National Aluminate Corporation, 6222 West 66th Place, Chicago, Ill. Nov. 3, page 655.



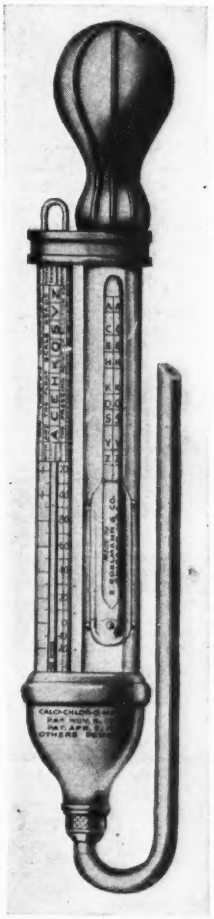
Hydrometer for Saline Concentration

The use of this specially designed hydrometer to determine the saline concentration or density of boiler waters obviates the necessity of making corrections with the aid of tables or waiting for the temperature of the boiler saline to reach any exact point. With this instrument temperature corrections can be read directly in terms of density. An integral thermometer is incorporated in the bulb of the instrument to make the correction quickly.

Permutit Company, 440 4th Ave., New York City. April 21, page 642.

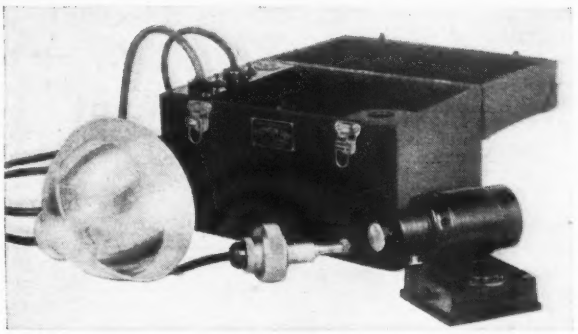
Testing Instrument for Calcium Chloride Brine

The "Calci-Chlor-O-Meter" shows the exact freezing point of any calcium-chloride brine automatically, taking into consideration the temperature of the brine. It combines in a single syringe a hydrometer and thermometer with a container and means of withdrawing the brine. It has its own correction table, which resolves the float scale reading and temperature reading down to the true freezing point.



The freezing point of any brine from minus 20 to plus 120 deg. can be ascertained, it is claimed, with accuracy in as brief a time as it takes to read the instrument. Also, it is not necessary to have a knowledge of chemistry to make an accurate test.

E. Edelmann & Company, 2332 Logan Bldg., Chicago, Ill. July 14, page 66.



Vibroscope With Increased Illumination

Model 3 Vibroscope has approximately five times the illuminating power of the Model 1 instrument, previously available, and is applicable to the study of any type of motion that occurs in repeated cycles on apparatus running at speeds from 40 to 12,000 r.p.m.

A hand lamp consisting of an aluminum reflector 8½ in. in diameter and three Neon tubes is used to illuminate the moving mechanism. The lamp is made to flash in synchronism with the motion or at a low multiple of it by means of a breaker head driven from the mechanism under observation. By adjustment of a small knurled knob in the breaker head the Neon tubes can be made to flash at different positions in the revolution, so that the moving mechanism may be observed at different points in its cycle. For speeds above 12,000 r.p.m. a small motor unit is used.

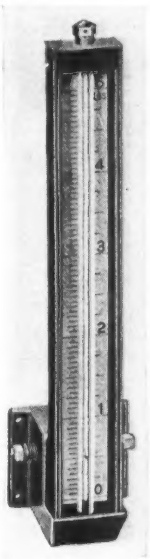
Electrocon Corporation, 6 Varick St., New York City. March 10, page 419.

Boiler-Water Test Kit

By following the instructions attached to the cover of this boiler-water test kit it is claimed that anyone can make all of the necessary tests of raw water and boiler water in fifteen minutes.

The instrument is also suitable for test work in plants other than those equipped with continuous blowdown. Report sheets are provided from which it is possible to forecast the possibility of priming, scale, corrosion, caustic embrittlement, etc.

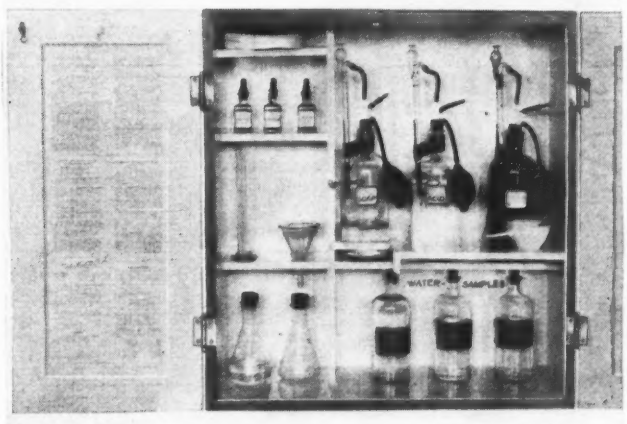
Henszey De-Concentrator Company, Watertown, Wis. March 17, page 458.



Gage for Low Pressure and Vacuum

In this improved mercury column gage for pressures up to 26 lb. and for vacuum, a glass tube is mounted in a U-shaped scale case and the mercury level stands out sharply against the white backing of the glass tube. Depressed black graduations and figures give a clear and distinct reading, visible from a distance. Right, left or top connections on the mercury chamber may be used.

Amthor Testing Instrument Company, Inc., 309 Johnston St., Brooklyn, N. Y. June 16, page 970.



Miscellaneous Equipment and Tools

Wire Cable Tension Indicator

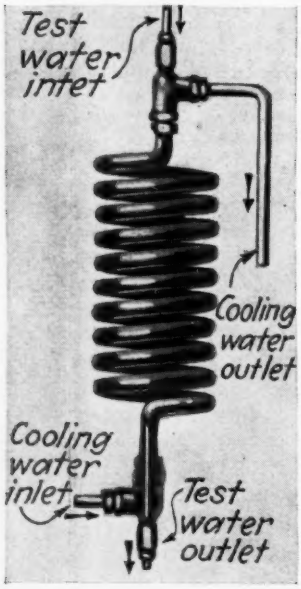
For obtaining line loads on cranes, guys, transmission lines, etc., and for determining the pull on various types of hoists and elevators, the cable tension indicator is made in two sizes: the standard model for cables between $\frac{1}{4}$ in. and $\frac{3}{4}$ in. in diameter and loads up to 16,000 lb., and the heavy-duty model for cables from $\frac{3}{4}$ in. to $2\frac{3}{8}$ in. in diameter and loads up to 26,000 pounds.

At each end of the instrument adjustable clamps bring the line to a fixed stop. Between these clamps the line is offset by a projection carried by a pressure plate. This pressure plate bears against a diaphragm backed up by a body of fluid.

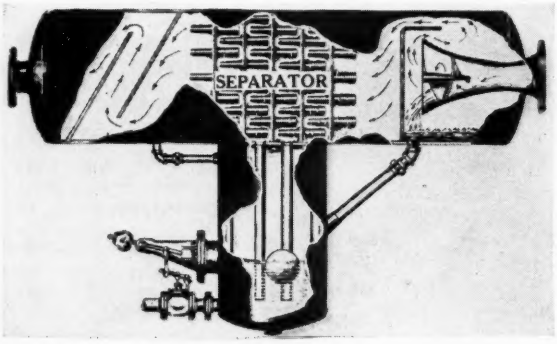
Martin-Decker Corporation, 3431 Cherry Ave., Long Beach, Calif. Dec. 1, page 808.

Test-Water Cooling Coil

To provide a practical means of obtaining test water samples and cooling them to room temperature, this cooling coil has been made available. It consists of a tube within a tube and is made from copper tube and "Dieform" compression fittings.



Bailey Meter Company, 1034 Ivanhoe Road, Cleveland, Ohio. April 14, page 604.



Steam Purifier Employs Venturi Nozzles

In this separator, steam enters through a Venturi-shaped tube, in which its velocity is materially increased, then through a spiral expanding web and against a heavily ribbed conical-shaped baffle, where the heavier water particles are separated and the steam expands into a large receiving chamber. From this chamber the steam enters a series of Venturi-shaped nozzles. Leaving the nozzles at high velocity, it strikes a ribbed baffle plate and is deflected in a direction counter-flow to the inlet of another series of nozzles. This counter-flow action and the speeding up and slowing down continues through five sets of baffles and nozzles. A drain is provided between each set of baffles to a receiver from which the condensate is discharged through a float-controlled valve.

Farnsworth Company, Watertown, N. Y. Dec. 15, page 877.

Chemical Feeds for Water-Treating Systems

In both the lime-soda and acid water-treating systems a standard water meter with a cam attached is used to measure the flow of water to the unit and to make the electrical contacts which furnish the impulse to start the motor of the control unit.

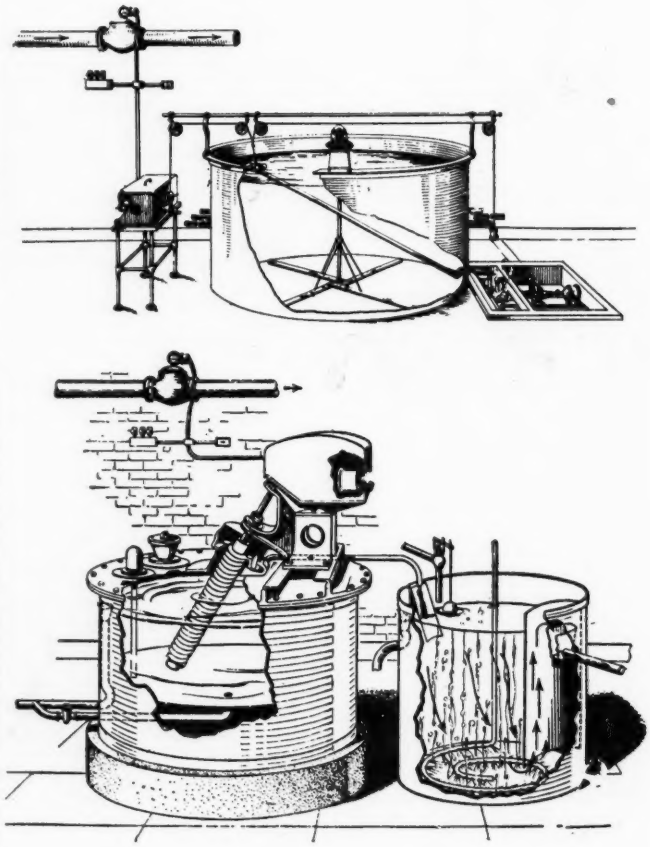
In Type B the control unit functions to raise or lower a swing draw-off pipe in the chemical-feeding tank and thus regulate the amount of chemical feed to the dilution tank. A motor cam on the control unit is rotated through a separate pawl-and-ratchet drive so that its speed can be set as desired. This setting determines the volume of chemical feed per unit volume of water passing the meter irrespective of the rate of flow of water.

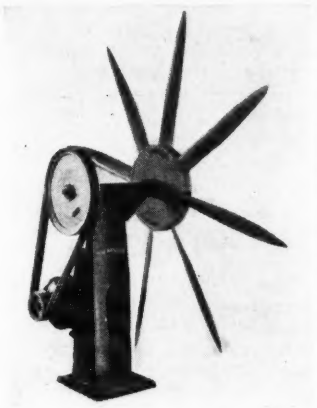
In Type D unit, generally called "acid feed," the same type of meter, with contact cam attached, is employed to measure the water and control the supply of current to the motor of the control unit. In place of a swing draw-off pipe the control motor operates a helical-rotor positive-displacement pump. This pump withdraws at each revolution a definite volume of chemical solution irrespective of the level of chemical in the tank; thus a definite volume of chemical per cycle is fed to a given volume of water. In both systems signal lamps indicate at all times how the chemical feed is operating.

Permutit Company, 440 Fourth Ave., New York City. April 28, page 680.

Multi-Blade Fan for Cooling Towers

Through the use of this large-diameter, multi-blade fan operating at comparatively slow speed the peripheral tip speed is cut in half, thus providing quieter operation. All blades are mounted individually on a common hub and are readily adjustable or removable to meet actual operating conditions. Fan speed is readily increased or decreased by changing the sheaves of the V-belt drive. The hubs and blades are of aluminum alloy, and roller bearings are used. A direct-connected fan unit is also available for use where requirements are for



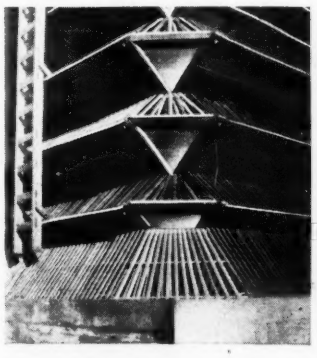


higher pressures or for smaller fans with reduced volume.

Marley Company, 1737 Walnut St., Kansas City, Mo. Dec. 8, page 843.

Cooling Tower With Double Louvers

Provision for more air at uniform velocity, elimination of excessive moisture entrainment and reduction of drift losses to a minimum are some of the claims made for this new louver system, involving the use of two separate sets of louvers. The first, or primary, louvers are solid, being inclined outward and upward away from the tower. The secondary louvers are placed at right angles to the primary louvers and extend



across the entire space between them.

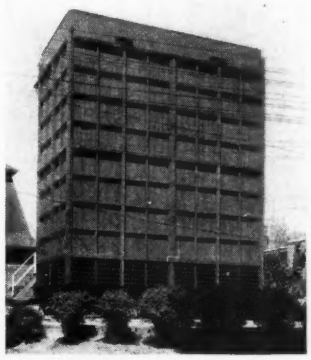
The width of the openings between the primary louvers is nearly double that generally used, and the secondary louvers are spaced to give the added draft resistance to compensate for opening up the primary louvers and at the same time effectively force air equally to all parts of the tower. Decks are of rough-surfaced redwood and are arranged and spaced so that all falling water is arrested and splashed at each deck.

Marley Company, 1737 Walnut St., Kansas City, Mo. March 24, page 494.

Induced-Draft Water-Cooling Tower

Placing the fans at the top of this induced draft cooling tower precludes the possibility of ice forming on the fan blades, as the fans handle the warm exhaust air only. Multi-speed remote control of the fans permits adjustments to suit any load or weather condition. Large natural-draft openings make it possible to shut down the fans entirely for a large portion of the year.

The tower is constructed of cypress or redwood treated with



a preservative. All metal parts are thoroughly rustproofed or are made of a non-ferrous composition.

Schubert-Christy Corporation, Affton, Mo. Nov. 10, page 689.

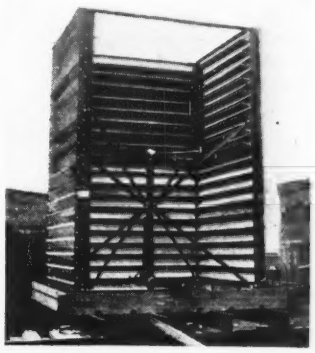
Self-Cleaning Heat Reclaimer

Mechanical cleaning by means of a perforated plate in each section is a feature of the Hoppes heat reclaimer. Each plate is mounted on two coarse-pitch screws by means of bronze nuts. The screws are revolved simultaneously by a reversible motor and chain drive and carry the perforated plates from one end of the tubes to the other and back. To operate the cleaning device a double-throw switch is closed to move the plates from one end to the other of the bank of tubes. At the end of the travel one plate contacts with a collar and stops the motor. The motor is then reversed by the switch and the plates brought back to the starting point. The openings in the plate are slightly larger than the tubes to prevent scraping, but the nozzle effect gives a scrubbing action. The reclaimer is built with waterboxes of different sizes and length of tubes.

Hoppes Manufacturing Company, 19 Larch St., Springfield, Ohio. March 31, page 529.

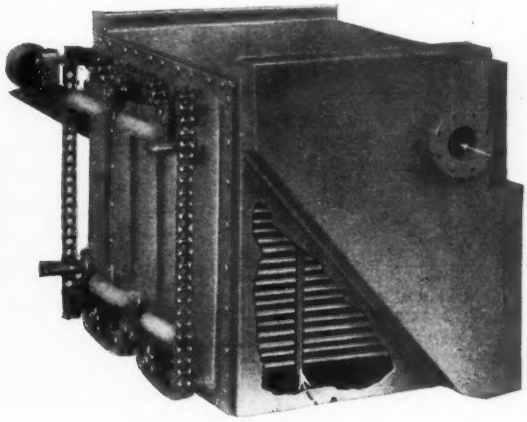
Spray-Type Cooling Tower

In this tower the cooling is done by a spray nozzle inclosed in a framework which permits free access to the air from any direction and prevents loss of water from windage. All four sides are fitted with louvers made of wood or metal. The upper part of the tower is fitted with V-louvers which permit the spray nozzles to discharge upward without any spray having a free outlet. Much of the



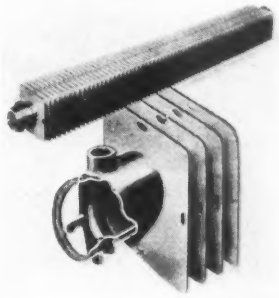
water is collected in the V-louvers and passes downward in the nature of a cooling tower and acts as additional cooling surface.

Edwin Burhorn Company, West 5th St., Bayonne, N. J. Dec. 22, page 913.



Grids for Refrigerating Systems

Hydro-Thermal Grids consist of an outer tube with fins inclosing an inner tube. The fins provide a large heat-absorbing area in small space, while the tube-within-a-tube construction spreads out the refrigerant in a thin layer be-



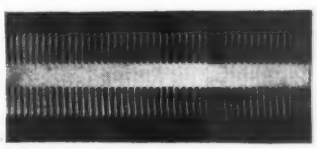
tween the concentric tubes and in contact with the large area of the outer tube. The refrigerant enters at one end of the tube; the heat-laden gas escapes at the other end. The inner tube can be filled with brine when a holdover is desired. Both the tubes and the fins are of steel to preclude any possibility of electrolytic action between them.

From the standard grids, which are available in three sizes and a number of lengths, low-side units of any size and shape may be assembled.

American Engineering Company, 2412 Aramingo Ave., Philadelphia, Pa. March 3, page 382.

Refrigerating Evaporator Unit

Light-weight rustless aluminum alloy known as "Aluminol" is the metal used in this evaporator unit, which is suitable for use with either direct-



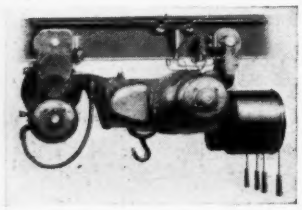
expansion or brine-circulating systems.

The units are cast integrally and when so specified can be cast in multiples of two, three, four or more in one piece. The radiating fins on the units are tapered from $\frac{7}{8}$ in. at the base to $\frac{1}{8}$ in. at the top, to cause gradual defrosting. Units cast in multiples of from two up to 120 can be furnished.

Aluminol Products Corporation, 320 Marion Bldg., Cleveland, Ohio. Oct. 13, page 546.

Motor-Operated Hoist and Trolley

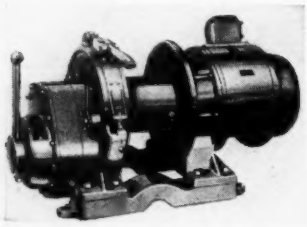
The "Compact Hoist" embodies sectionalized construction and interchangeable parts. By the use of the same hoist body piece and attaching different motor and gear-end sec-



tions varying requirements of speed and capacity can be met. The motors are especially designed for hoisting service and are of 30 min. 50 deg. F. rating. A fully inclosed load block is used except on the close-clearance hoist. An electric brake and limit switch are employed.

Model 21 motor-driven trolley is of all-steel construction and fitted with ball bearings throughout. It is designed to negotiate small-radius curves (3 ft. min.) and through narrow switches.

Shephard Niles Electric Crane & Hoist Corporation, 388 Schuyler Ave., Montour Falls, N. Y. Feb. 3, page 201.

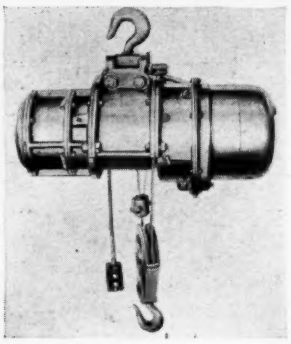


Electric Portable Hoist

Suitable for all single-cable work within its capacity, such as hoisting, pipe hauling and spotting cars, and for single-line scraping, this non-reversible, single-drum motor driven hoist is made in two sizes. No. 107 is of 7½ hp. and rated 2,000-lb. pull at 125 ft. a minute, with a drum capacity for 400 ft. of ½-in. or 700 ft. of ⅜-in. cable. No. 107L is of like power, but has drum capacity for 800 ft. of ½-in. or 1,400 ft. of ⅜-in. cable. No. 110 has a 10-hp. motor and is rated 2,000-lb. pull at 165 ft. a minute.

These new hoists have a self-energizing brake for stopping and holding the load and an automatic safety drum lock for added safety when handling suspended loads.

Ingersoll-Rand Company, 11 Broadway, New York City. Jan. 12, 1932, page 77.



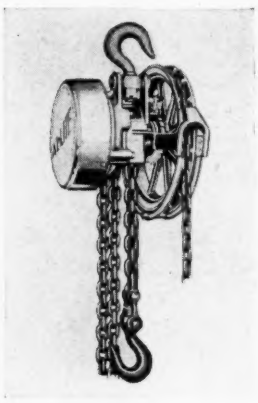
Electric Industrial Hoists

Supplied with either rope or pendant control, the Wright hoist is available in capacities ranging from 500 to 10,000 lb., and with hoisting speeds ranging from 70 to 12 feet per minute. The hoists are equipped throughout with roller bearings, and with roller-bearing totally inclosed motors, either alternating-current or direct-current. Where push-button control is used the control switch carries only current for energizing the contactor. The variable-speed controller works in connection with a mechanically interlocked reversing contactor, the controller being of the faceplate type.

Wright Manufacturing Company, 929 Connecticut Ave., Bridgeport, Conn. March 31, page 531.

Chain Hoist of Aluminum Alloy

Being one-third lighter than the regular chain hoist for the same capacity, the "Al-Lite" aluminum-alloy chain hoist is more easily handled and hung in place by one man. Other features in addition to lightness

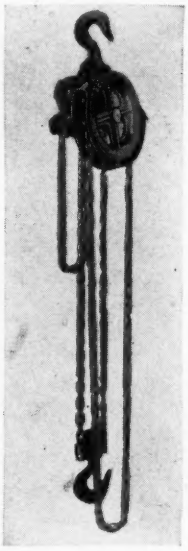


and portability are simple design, easy accessibility, planetary-type gears and adjustable positive action brake.

Chisholm-Moore Hoist Corporation, 5045 Fremont Ave., Tonawanda, N. Y. April 14, page 603.

Improved Screw Hoist

Light, compact and particularly suitable for general repair work, Model 30 hoist is designed on the worm-wheel principle, it has few parts, and is of simple construction. It is equipped with special-analysis-steel load chains, heat-treated, drop-forged hooks, chain guards

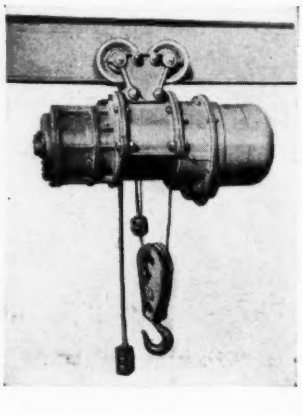


shrouding the complete upper half of the load wheel and preventing the load chain from riding out of the wheel pockets.

Wright Manufacturing Company, 929 Connecticut Ave., Bridgeport, Conn. Nov. 10, page 689.

Electric Trolley Hoists

A line of Wright hoists including plain, geared, and motor-driven trolley types has been made available. In the motor-driven trolleys the wheels are driven on each side of the I-beam and are equipped with a safety stop. Controllers for single-speed, two-speed or variable-speed can be furnished. The hoists have full size drums, push-button or pendant rope control, Tru-Lay preformed cable, safety-type limit switch,



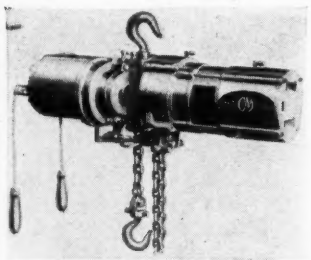
positive braking and weather-proof motors. Lifts of 9, 18 ft., and 36 ft. can be supplied.

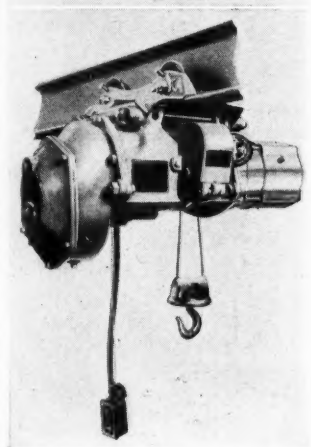
Wright Manufacturing Company, 929 Connecticut Ave., Bridgeport, Conn. Oct. 13, page 547.

Chain and Wire Rope Hoists

The "Cyclone" hoist is fitted throughout with ball bearings and is driven by a ball bearing motor equipped with a built-in magnetic brake. The hoist is normally furnished with hook suspension, but where desired it can be furnished closely connected to a low headroom type of tandem trolley. It is supplied with either pendant rope control or push-button control.

In the "Hi-Up" wire rope hoist the ½-ton capacity unit requires only 13 in. headroom, and the 1-ton capacity requires



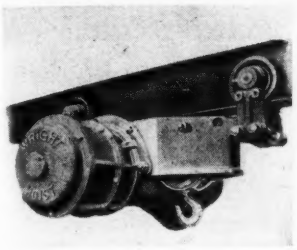


only 15 in. headroom. The hoisting mechanism is equipped with roller bearings and the driving mechanism with ball bearings. The hoist can be furnished with lug suspension for stationary mounting or equipped with ball-bearing push-type trolley.

Chisholm-Moore Hoist Corporation, 5045 Fremont Ave., Tonawanda, N. Y. March 10, page 418.

Electric Hoist for Minimum Headroom

In Type WH electric hoist minimum distance from the bottom of the I-beam to the hook



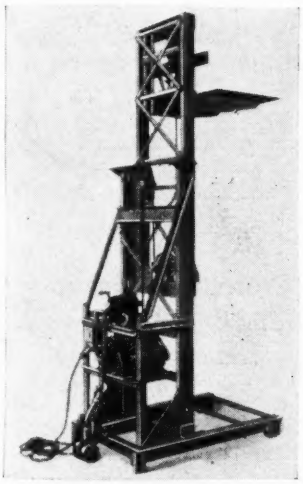
on the ½-ton unit is only 11 in., and on the 1-ton hoist only 13 in. It is furnished with either push-button or pendant rope control, True-Lay performed cable, safety-type limit switch, safety-type load block and positive mechanical brake.

Wright Manufacturing Company, 929 Connecticut Ave., Bridgeport, Conn. Aug. 11, page 214.

Hand- and Motor-Operated Lifting Machines

Ball bearings are used throughout the gearing, sheave and platform frame wheels, and also on the sliding frame wheels of these telescoping units. In the hand-power type only 25 lb. cranking pressure is required to lift the load.

The electric machines are equipped with high-torque motors of ½, 1, 2 and 3 hp. or more, depending on the speed of operation. All are controlled alike, unless otherwise specified, by a single-lever drum switch. Automatic limit stops prevent



overtravel of the platform by returning the control lever to "stop," halting the motor and setting the brake.

This machine can be used for raising motors and other equipment into position or to provide a scaffold.

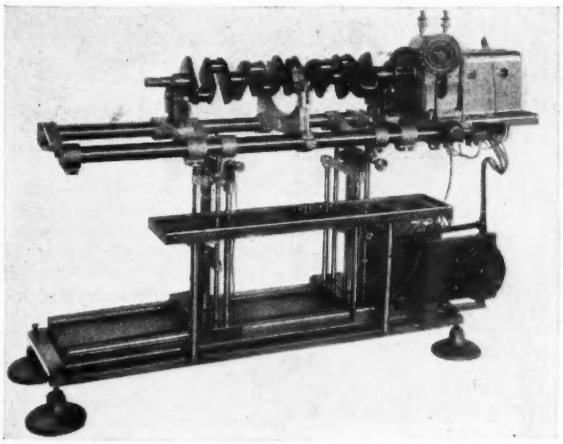
Economy Engineering Company, 2653 West Van Buren St., Chicago, Ill. Feb. 3, page 201.

Electric Drill and Hammer

In addition to operating as a hammer, this tool may be used as a rotary drill and also for grinding, scratching and buffing. The tool itself weighs only 12 lb. and the entire kit 20 lb. A bench stand as well as a convenient stand for use as an auxiliary drill press or bench grinder can be furnished.

Drilling up to ⅜-in. holes in metal, ½-in. holes in wood and ⅞-in. holes in concrete or brick is possible with this tool.

Wodack Electrical Corporation, 4627 West Huron St., Chicago, Ill. Feb. 3, page 201.

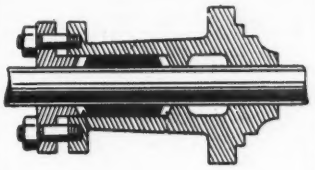


Dynamic Balancing Machine

The Olsen-Lundgren dynamic balancing machine consists of a vibrating frame carried on flexible members slidably mounted on the base. The vibrating frame comprises two horizontal shafts, roller brackets, center steady rest for preventing excessive whip of long crankshafts, driving means and the mechanism comprising the phase-angle shifter. The vibrating frame may be locked at two points to obtain the amount of unbalance.

The crankshaft is rotated at 250 r.p.m., and a sparking apparatus is used to show the angular position of unbalance in the shaft. The machine is available in five sizes having the following capacities: No. 2, 10 to 50 lb.; No. 3, 30 to 175 lb.; No. 4, 150 to 750 lb.; No. 5, 500 to 2,500 lb.; and No. 6, 2,000 to 10,000 lb.

Tinius Olsen Testing Machine Company, 500 North 12th St., Philadelphia, Pa. March 3, page 382.



Plastic Metallic Packing and Gaskets

One grade of this plastic packing is designed for saturated steam, hot and cold water, air, gases, brine and liquid ammonia for temperatures up to 600 deg. F. A finer grade of the same material is used for bronze sleeves, valve stems, or where the diameter of the rod or shaft is less than 1 in. A third grade is prepared for tar, oil, gasoline and all petroleum products for temperatures up to 600 deg. Other grades are prepared for superheated steam temperatures up to 2,200 deg., for extra-heavy duty, or for special uses where corrosive substances are handled.

Companion products are a packing material for bolted flanges known as "Plasket," also made in a number of grades, and a material designated "Pipease," for threaded joints. Resembling a heavy putty-like mass, these materials are applied in a thin layer with a putty knife to the sealing surface. These products come in cans of 1½ to 10 lb., or in larger lots in drums.

Seliger Engineering & Packing Company, 3223 Ravenswood Ave., Chicago, Ill. July 7, page 33.

Spray Gun With Adjustable Nozzle

With the Thor Model 2 gun change in size and shape of spray by adjustment of the control screws at the back of the gun above the handle can be effected without stopping operations. All types of material, from thin priming coats to heavy body lacquers and enamels, may be atomized and applied.

In operating the gun the first pull on the two-finger trigger allows air to pass from the nozzle for cleaning the surface to be painted. Further pull on the trigger permits the paint to flow in the size and shape of spray designated by the adjustment. Self-centering of the air nozzle keeps it in alignment with the fluid tip. Construction of the gun includes a drop-forged body, die-cast handle and a fluid nozzle of special stainless steel.

Binks Manufacturing Company, 3113 Carroll Ave., Chicago, Ill. Dec. 15, page 877.

General-Utility Portable Crane

Made in four types, hinged, telescopic, revolving hinged and revolving telescopic, with capacities of 500 to 2,000 lb., this portable crane is adaptable to a variety of uses around power and industrial plants.

In the hand-driven unit, intended for short lifts and intermittent service, the worm has the self-locking feature requiring no brake. Units equipped with motor drives ranging from ½ to 3 hp. are provided with master line switch, thermal overload protection and automatic limit stop. Units with an air-motor or gas-engine drive are available. Lifting heights range from 6 to 14 feet in each type.

Lewis-Shepherd Company, 125 Walnut St., Boston, Mass. June 16, page 971.

Industrial Brake Lining

Garlock 701 industrial brake lining, designed for severe duty is constructed of asbestos cloth, impregnated with a special rubber compound, then folded, molded and vulcanized under 2,000-lb. pressure. It is available in widths from 1½ to 12 in.

Garlock Packing Company, Palmyra, N. Y. Nov. 10, page 688.

Extractor for Broken Screws and Studs

The "Little Giant" screw extractor feeds itself into a hole drilled in the broken screw or stud, instead of having to be hammered in. This prevents expansion of the broken screw and jamming of the thread. The

tool is made in diameters for the small end of $\frac{1}{16}$ to $1\frac{27}{32}$ inches.

Greenfield Tap & Die Corporation, Greenfield, Mass. July 21, page 105.

MISCELLANEOUS MATERIALS STEELS AND ALLOYS

Stainless Steel

A free-machining, chrome-nickel, stainless steel, claimed to be tougher than mild steel, to have high resistance to steam corrosion and the majority of chemical agents, and to remain scale-free under the highest steam temperatures has been made available. Made in a number of grades, it is particularly suitable for fabrication into turbine blades (Carpenter No. 1); valve trim for gate, globe and safety valves; meter parts, such as shaft gears, segments, connecting links and Bourdon tubes; pump shafts and a variety of other parts where resistance to corrosion and erosion are essential. Stainless No. 8 and No. 4 may be used interchangeably for practically any corrosion-resisting purpose, No. 8 being used for parts that are to be machined and No. 4 for parts that are bent, drawn or formed to shape.

Carpenter Steel Company, 119 West Bern St., Reading, Pa.

Metal for Industrial Castings

Characteristics of Promal are great strength and resistance to wear. Of a specially processed malleable iron, it can be heated repeatedly to a maximum of 1,000 deg. F. and cooled without affecting its physical properties. It is said to have a uniform structure throughout its cross-section, and unusually high yield point and high fatigue strength and elongation indicates its ability to withstand heavy loads repeatedly without permanent distortion or failure.

Copper-bearing Promal can be supplied where exceptional resistance to corrosion is desired. By the addition of suitable alloying elements, ultimate strengths up to 100,000 lb. per square inch, with a yield point of 75,000 lb. per square inch and 10 per cent elongation in 2 in., are possible.

Link-Belt Company, 910 South Michigan Ave., Chicago, Ill. Nov. 3, page 655.

Chromium-Alloy Steel

A non-corrosive chromium-alloy steel with a yield point of 57,000 lb. per square inch a tensile strength of 90,000 lb. per square inch and a Brinell hardness of 174 is now available. When fully heat-treated this alloy has a yield point of 158,000 lb. per square inch, a tensile strength of 174,000 and a Brinell hardness of 352. It is available in ground bars, cold-drawn rods, heat-treated bars, forging billets, drop forgings, etc.

Bethlehem Steel Company, Bethlehem, Pa. April 7, page 567.

Wire Rope of Stainless Steel

"Korodless" wire rope, in addition to resisting chemicals, salt water and salt air corrosion, can be operated safely in temperatures up to 1,650 deg. Preformed construction is used, the strands and wires being helically shaped to the exact form they assume in the rope structure. Standard sizes are available.

Hazard Wire Rope Company, Wilkes-Barre, Pa. March 17, page 459.

Corrosion and Heat-Resisting Steel

This steel has in a marked degree the physical properties of 18-8 chrome-nickel steel alloy, but exceeds the latter in remaining stable to 1,500 deg. F., with no brittleness range and having low creep. The analysis is as follows: Carbon, 0.15-0.25; manganese, 0.55 maximum; silicon, 0.55 maximum; chromium, 4.50 to 6.50; tungsten, 0.75-1.00; sulphur, 0.05 maximum, and phosphorus, 0.05 maximum. With proper heat-treatment of the metal the tensile strength is 125,000 lb. per square inch.

Industrial Steels, Inc., Cambridge, Mass.

Heat and Corrosion Resisting Steel

Nine grades of Bethadur are manufactured. Bethadur No. 1 is of the standard corrosion-resisting iron type. The No. 4 is similar to No. 1 in that it requires no heat-treatment to bring out the maximum heat-resisting properties. No. 5 has more chromium than the No. 4.

Bethadur No. 2 is the 18-8 composition. Bethadur No. 3 is primarily an acid-resisting steel. Nos. 6 to 9 have increasing amounts of carbon and also of chromium to increase the hardness and corrosion-resisting properties.

Bethlehem Steel Company, Bethlehem, Pa.

Low-Melting-Point Brazing Alloy

Low melting point of 1,300 deg. F. is an important characteristic of brazing alloy Sil-Fos containing a small percentage of silver. The low melting point permits brazing and welding without danger of weakening, distorting or destroying the parts adjacent to the joint. It also possesses free-flowing properties with deep and quick penetration, and requires less than the usual amount of flux, owing to the deoxidizing effect of the phosphorous in the alloy. It can be used for joining brass, bronze, nickel, nickel bronze, monel and other metals and alloys fusing at about 1,300 degrees.

Handy & Harman, 57 William St., New York City. Oct. 13, page 547.

Protective Coating

This protective coating is said to contain no dyes, lamp black, rosin, asphalt, vegetable or animal oils, and offers protection against all acids, alkalies, salts and indirect heats from 1,400 to 1,500 deg. F. It is for application to woods, fabrics, various kinds of metals and stone.

Liquilox Company, Ltd., 576 Subway Terminal Bldg., Los Angeles, Calif. Oct. 13, page 547.

Thermoplastic Compound

"Codite," a thermoplastic compound, has a dielectric strenght of 523 volts per mil for tubing 5/16 in. in internal diameter by 13/32 in. in outside diameter. It is increased to 710 volts per mil for tubing 5/16 in. in internal diameter by $\frac{3}{8}$ in. in outside diameter. It can be machined easily and its surface is capable of taking a high polish.

Continental-Diamond Fibre Company, Newark, Delaware. June 16, page 971.

"Cee Bee" Cleaning Compounds

Offered for all industrial cleaning problems, these compounds are strictly physical agents and do not combine with oil, grease or any foreign matter. They clean by deflocculation of solids and the emulsification of liquids and may be applied by hand, by emersion, by pressure gun or through circulation. They are sold in containers holding from 1 to 600 pounds.

Cee-Bee Laboratories, Ltd., 655 East Gage Ave., Los Angeles, Calif. Sept. 22, page 441.

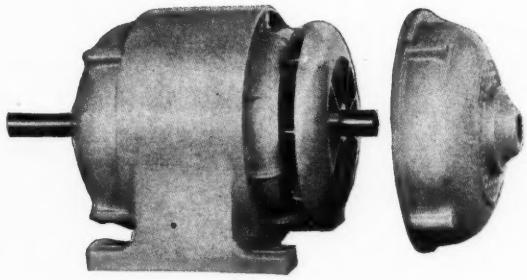
Protective Paint for Pipe Lines

Protective paint for use on steam and hot-water pipe lines, known as ADSCO, Pipe-Kote 505 is impervious to any degree of heat generated by steam; is practically immune to the action of moisture, dilute acids and alkalis, yet it is sufficiently elastic to expand and contract with the pipe without cracking or peeling. It can be used on gas and water mains, stacks, boiler fronts, bridges, and all other surfaces exposed to extreme or rapid changes of temperature and atmospheric conditions.

American District Steam Company, North Tonawanda, N. Y. Nov. 10, page 688.

Motors, Electrical and Elevator Equipment

Developments of fully inclosed and explosion-proof motors continues. Motors with separable mechanical and electrical parts introduced. Use of steel welded parts for motors extended. Recent additions in starters, switches, instruments and metal-clad switchgear are included



Fully Inclosed Fan-Cooled Motor

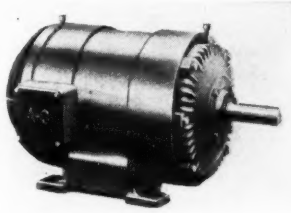
Two iron housings completely incase bearings, air gap, rotor and windings of the "Klosed-Tite" motors. A fan on the end of the motor shaft forced cooling air across large external surfaces of the inner housing and out through openirgs in the other end. "Lubri-Seal" ball bearings and labyrinth seals prevent the entrance of dirt into the bearings. The motor leads are sealed into the frame casting and are thus protected from ventilating air and the entrance of moistu e.

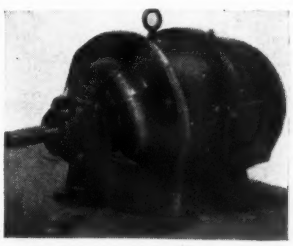
Sterling Electric Motors, Inc., 5401 Telegraph Road, Los Angeles, Calif. Aug. 18, page 251.

Explosion-Proof Motor for Hazardous Atmospheres

Approved by the Underwriters' Laboratories for use in Class 1, Group D locations, the construction of this motor is along the same general lines of the totally inclosed, fan-cooled motor built by the same manufacturer. Its special features include extra long bearing seals to prevent the escape of flame and to cool the gases below the point of ignition, special alloy-steel cap screws that fit into tapped pockets and unusual sturdiness to resist safely stresses due to possible internal explosions or flashes.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis. July 7, page 32.





Totally Inclosed Fan-Cooled Motor

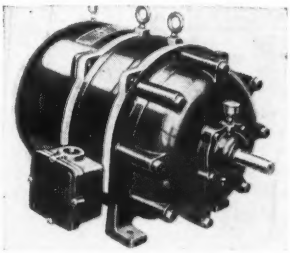
Designed for use in explosive atmospheres, this totally inclosed fan-cooled squirrel-cage motor meets the latest specifications for use in Class I, Group D hazardous locations.

Free passage of cooling air is provided by large air passages and large spaces between the guard and the non-sparkling aluminum alloy fan. Air inside the motor is kept in constant circulation by fan blades on each end of the rotor. The prewound primary core is interchangeable and renewable.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Nov. 3, page 655.

Inclosed Motor for Hazardous Locations

Designed especially for use in explosive atmospheres and built in either polyphase or



single-phase design, with a totally inclosed frame or a totally inclosed fan-cooled frame, this motor has extra-heavy castings, bolts and parts. All machined parts have large fitting surfaces to meet the Underwriters' Laboratory requirements.

The single-phase motors are of the condenser-start type, each motor having a condenser starting unit placed in a separate box which must be outside the hazardous area.

Howell Electric Motors Company, Howell, Mich. March 17, page 459.

Motor With Separable Mechanical and Electrical Parts

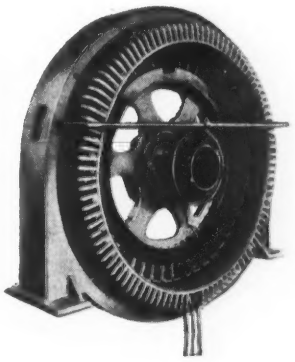
In type CS, W-frame squirrel-cage induction motor the stator core containing its winding is pressed into the motor frame. When it becomes necessary to replace a damaged winding, the old core and its winding are pressed out as a unit and a new "prewound" core is pressed in.

Like the stator core and its winding, the rotor is a complete separate unit, and both the rotor and the stator core and winding can be supplied as such for built-in motor or repair purposes. The separate-frame construction makes it possible to supply any one of a number of different types of frames, such as vertically or horizontally mounted motors, motors without feet, and open, semi-inclosed and totally inclosed motors.

Westinghouse Electric & Manufacturing Company. June 30, page 1046.

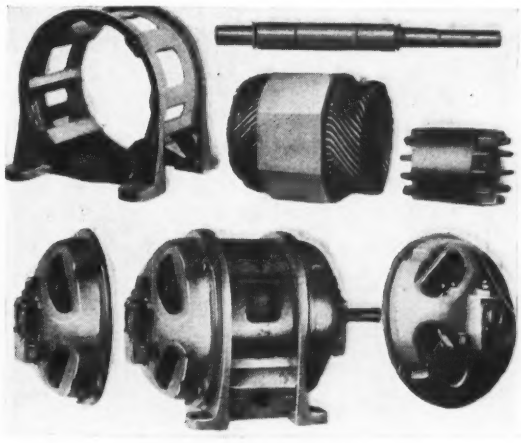
Motors With Fabricated Steel Stator Frame

A recent change from a two-piece cast-iron stator to a welded steel stator for small-sized motors completes the changeover to fabricated steel frames for the entire line of engine-type and coupled-pedestal-type synchronous motors put out by this company. The box-type stator construction is used for the entire line of slow-speed synchronous motors, and is



claimed to give increased strength and rigidity, decreased weight and increased ventilation.

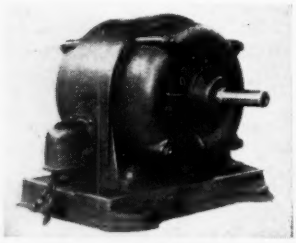
Electric Machinery Manufacturing Company, 1331 Northeast Tyler St., Minneapolis, Minn. Feb. 17, page 309.



Drip-Proof Unit-Type Motor

Large shrouded fans just inside the end brackets at each end catch any water entering through the end of this motor and throw it against the inside surface of the bearing bracket. From here the water runs down the inside of the bearing brackets and out through the center bottom vent without coming in contact with the windings.

The outer surfaces of the

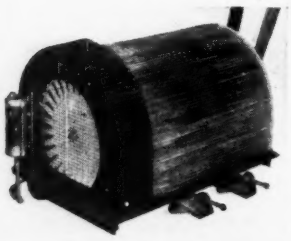


motor are such that water dripping from above cannot enter. The shroud cover encircling the motor at the center effectively prevents the entrance of water at that point. It does not completely surround the motor, but is open at the bottom.

Ideal Electric & Manufacturing Company, Mansfield, Ohio. June 30, page 1046.

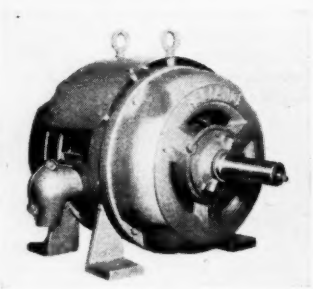
Inclosure for Open-Frame Motors

This inclosure, suitable for all open-frame motors, 2- and 3-phase, and direct-current motors in sizes from 5 to 100 hp., consists of a specially designed corrugated copper cover over



the motor, with steel end walls and supporting baseplate. At one end of the inclosure a cooling fan and an outside combination guard and air deflector are provided. By means of the fan and the air deflector a single path of outside air discharges over the outside areas of the deep-fin corrugated copper construction. The complete inclosure is designed to permit mounting on motor slide rails for belt adjustment.

Daun-Walter Company, 334 East Water St., Milwaukee, Wis. March 31, page 531.



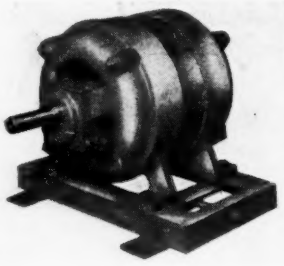
Motors Protected With Drip Covers

A line of drip covers applicable to either the alternating- or direct-current Reliance motors has been made available. The covers are used to protect the motors from dripping water, acid or other injurious solutions. They are made of heavy-gage sheet steel and are securely bolted to the frames in roof-like fashion, so that an opening is provided between motors and cover to permit free circulation of air.

Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland, Ohio. March 3, page 382.

Welded-Steel Motor Base

Replacing slide rails, these welded motor bases are constructed of rolled steel angles and flat bar stock fused into

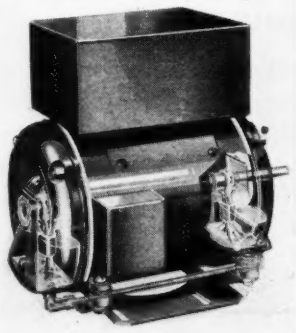


one unit. The angles are slotted to permit moving the motor on the base. Drilled angles arc-welded to the sides form hold-down lugs for securing the base in position.

Lincoln Electric Company, Colt Road and Kirby Ave., Cleveland, Ohio. June 2, page 896.

Improved Oiling System on Small Motors

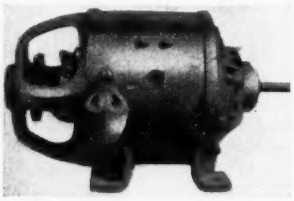
Two oil wells, one for each bearing, each having a reserve capacity said to be sufficient to provide proper lubrication over a long period of time without adding new oil is a feature of this motor. The wells are connected together at the bottom by a pipe line, giving the advantage of one-point lubrication. The shape and design of the oiling system is such as to



make it non-spillable no matter what position the motor is in.

Each sleeve bearing is wool-yarn-packed and has a wick running to the bottom of the well, which carries oil from the reserve supply to the bearing only as needed.

Howell Electric Motors Company, Howell, Mich. Jan. 12, 1932, page 77.



Small Direct-Current Motors

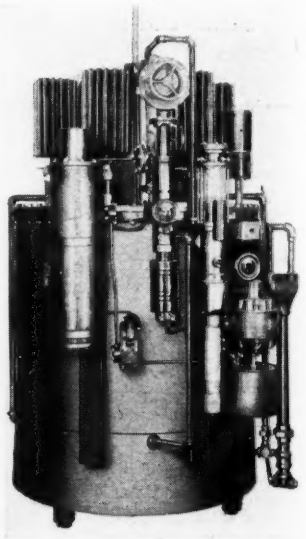
Type T heavy-duty motors comprises a line of small direct-current motors built in sizes from ½ hp. to 3 hp., 1,750 r.p.m., for constant- or adjustable-speed operation. Like the larger motors, they are provided with ball or sleeve bearings and may be had in either open, semi-inclused or fully-inclosed construction.

A feature is the use of the refillable-type commutator. If the copper bars become damaged or badly worn they may be easily removed and replaced.

Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland, Ohio. Nov. 17, page 722.

Steel Tank Mercury-Arc Rectifier

For some electro-chemical processes the power supply requirements are such that rectifiers provide the preferable means of conversion. The rectifier consists of a mercury pool cathode and an anode inside a steel tank, with facilities for condensing the mercury vapor, and the necessary aux-



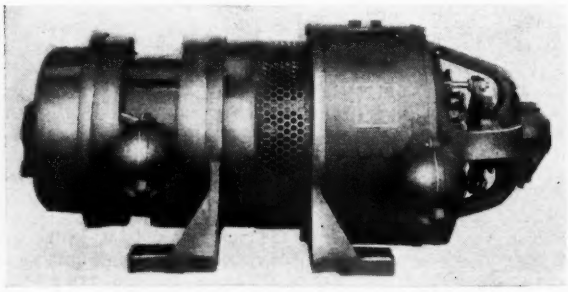
iliary apparatus for maintaining the vacuum and temperature conditions of the rectifier within the limits required for proper operation.

The mercury pool is contained in a cathode plate or disk insulated from the tank by a porcelain ring, the construction providing a cathode assembly removable as a complete unit. The anodes are of graphite. Switching equipment is available to meet the various applications ranging from manual to full automatic control.

Westinghouse Electric & Manufacturing Company. July 28, page 141.

One-Unit Motor-Generator Set

In this line of one-unit motor-generator sets the usual alternating-current motor and direct-current generator are combined

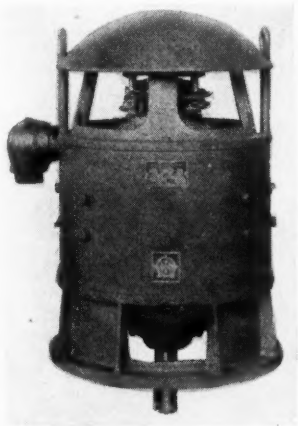


in a single unit, with the induction motor rotor and direct-current armature mounted on the same shaft. This design provides compact construction, requires less space than the two-unit set and simplifies installation. It can be furnished for operation in either two- or three-phase circuits on any standard voltage or frequency.

Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland, Ohio. April 28, page 679.

Direct-Current Vertical Motors

Type T vertical motors are provided with a ring base for mounting and a drip cover to protect them from falling dirt

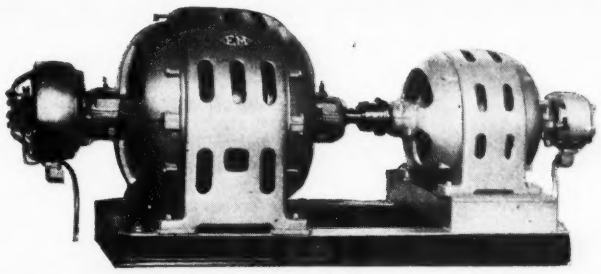


and chips, dripping water, oil or other injurious solutions. Where desirable, the motor may be mounted directly on the machine being driven, without the ring base, and made to appear as an integral part of the machine. In all other respects the construction is the same as Type T, direct-current, heavy-duty motor for horizontal operation.

Reliance Electric & Engineering Company, 1088 Ivanhoe Road, Cleveland, Ohio. Oct. 6, page 513.

Frequency-Changer Sets for Industrial Service

In the synchronous-motor-driven frequency changer set illustrated the motor is rated 50 hp. to operate on 60-cycle current at unity power factor. The alternator is rated 125 kva. to deliver 30-cycle current. In order that the generator excitation may be varied without changing the motor excitation, each machine is furnished with its own exciter, which is direct connected to the shaft. If desired, the motor may be designed for leading power factor



operation with more power factor corrective effect.

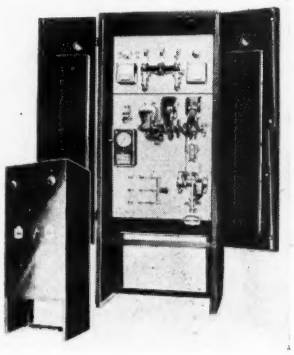
Electric Machinery Manufacturing Company, 1331 North East Tyler St., Minneapolis, Minn. Jan. 12, 1932, page 76.

STARTERS, SAFETY SWITCHES AND CIRCUIT BREAKERS

Motor Starters for Fire-Pump Service

Combined manual and automatic motor starters for fire-pump service comprising this line include a type of starter for every application of fire-pump equipment. A dustproof and splashproof, floor-type inclosure protecting the mechanism, consists of a heavy angle-iron supporting frame with sheet-metal inclosing panels and doors at the front.

Other features include: double-throw main-line knife



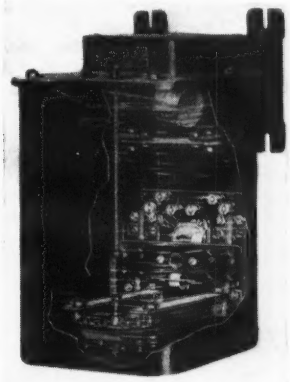
switch, for two sources of power supply; low-voltage protection; circuit breaker overload protection; carbon-to-copper current-carrying contacts; and pilot lights to indicate if the equipment is running or if power is on the line.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Nov. 17, page 723.

Explosion-Proof Starter for Hazardous Locations

Immersion in oil of the thermal-overload mechanism distinguishes this explosion-proof starter. It is designed to meet the latest requirements of the Underwriters' Laboratories for Class 1, Group D hazardous locations.

The contacts open under a 6-in. head of oil, and a new design of thermal overload mechanism is used. Special provision is made for bringing all

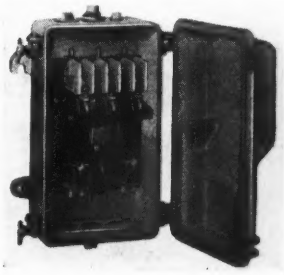


incoming wires to the terminals below the oil level. The starter is corrosion-resisting and therefore suitable for chemical plants and cement mills as well as a wide range of other applications.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Oct. 13, page 547.

Splashproof Starter for Squirrel-Cage Motors

Across-the-line starting switch Bulletin 710WT is rated

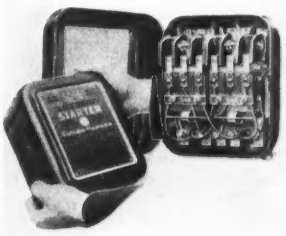


for squirrel-cage motors up to and including 100 hp., 220 volts and 200 hp., 440-550 volts. On slip-ring motors it serves to control the primary circuit up to and including the maximum rating listed for squirrel-cage motors. If the thermal relay reset button is omitted from the side of the cabinet, the starter is tight.

Allen-Bradley Company, 1311 South First St., Milwaukee, Wis. Sept. 22, page 440.

Reversing Starter for Small Motors

Reversing is accomplished in this starter by two mechanically interlocked magnetic contactors controlled from a remote point by a separate push-button



master station. Silver-to-silver contacts reduce arcing and pitting. The magnet structure consists of a laminated frame with a shading coil for alternating current and a brass shield for direct current.

Two types are available, SRA, arranged for two-wire control only and a maximum capacity of 1 hp., and SRB, for either two- or three-wire remote control.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Sept. 22, page 440.

Across-the-Line Motor Starter

No. 2, Type ZO starter is a self-contained unit, totally inclosed in a heavy pressed-steel case with oil-immersed main and control circuit contacts,

and vaporproof overload relays. Two thermal overload relays are used to protect the motors against single-phase and overload conditions. The starter may be used for low-voltage release or low-voltage protection applications. Standard, vaporproof or explosion-proof push buttons are available for use with these starters.

Electric Controller & Manufacturing Company, 2700 East 79th St., Cleveland, Ohio. Dec. 1, page 809.

Air-Break "Explosion-Proof" Starter

Type E starter is built to prevent the escape of flame from any explosion likely to occur inside the apparatus due

to grounds and burnouts. It has the usual across-the-line, air-break, magnetic contactor with overload and undervoltage protection. Strength to withstand explosion is provided by a heavy cast-iron case.

Louis Allis Company, 133 Stewart St., Milwaukee, Wis. Feb. 3, page 202.

Across-the-Line Starter for Small Motors

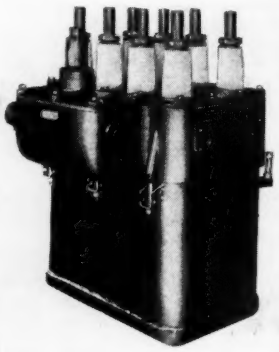
The twin-break contact mechanism employed in Bulletin 9115 starter gives a double break in each line, to reduce the voltage rise—and consequent arcing—when opening the circuit. The cover interlock

prevents opening of the inclosing case if the motor is running—the operating lever must first be returned to the "off" position.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Sept. 15, page 407.

Indoor Circuit Breaker

With inclosed-type mechanism and all poles in one tank, Type DR 25 circuit breaker offers



the features of non-oil throwing, greater clearances, quick clearing operation, small space requirements and provision for venting gases. It is furnished three- or four-pole, manually or electrically operated, for 600 to 1,200 amp. at 15,000 volts.

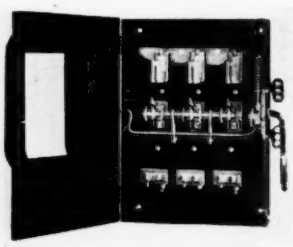
Condit Electrical Manufacturing Corporation, 842 Summer St., Boston, Mass. March 17, page 459.

Improved Safety Switch

The interlock mechanism of Type A safety switch has been simplified, with fewer operating parts, and is more compact. The interlock is controlled by a key, and the door can be opened only when the switch is closed through the use of the key.

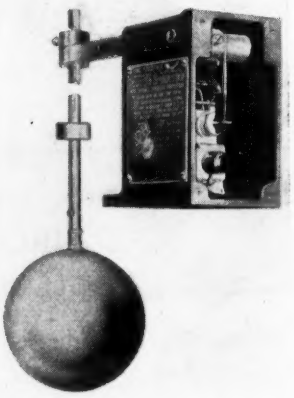
Positive-pressure fuse clips grip the fuses firmly under all conditions. The dust shields have been made wider, longer and stronger, and a slotted hexagon terminal nut on switches of 100-amp. capacity or less permits the use of a screwdriver, wrench or pliers.

Square D. Company, 6060 Rivard St., Detroit, Mich. Sept. 22, page 440.



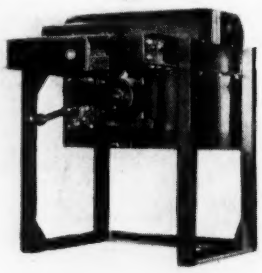
Float-Operated Motor Starter

For larger motors this float-operated starter can be provided without overload protection so it may be used as a master switch in the control



circuit of a separate automatic starter. It can also be furnished without the float accessories for use as a lever-operated master switch. The operating lever and shaft are reversible in the case and the operating lever may be shifted to any angular position of the shaft, so that either tank or sump operation can be obtained with the starter mounted in any position.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Oct. 20, page 583.



Transfer Switch for Two-Speed Fan Motors

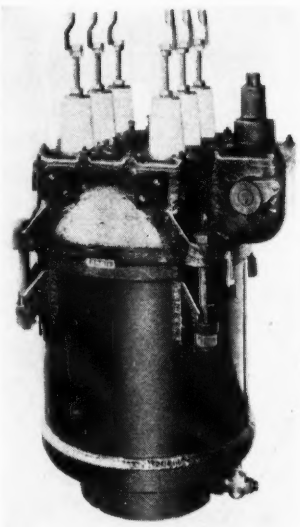
This two-speed oil-immersed selector switch for large two-speed fan motors 300- to 500-hp. at 2,300 volts is of three-pole double-throw design, with three positions: low speed, high speed and off.

It is cam-actuated, mounted on anti-friction bearings and driven by a ¼-hp. direct-current motor. Dynamic braking is secured on the motor without additional contactor parts by connecting the braking resistor permanently across the armature. Manual operation is provided for from a detachable handle. Rotation of this handle through slightly more than one revolution will move the switch from any position to an adjacent position. A position indicator is provided. Transferring from automatic to manual operation is done by disengaging a small lock pin and pulling out on the manual drive shaft. Similar switches have been made in the air-break form for 440-volt service.

Cutler-Hammer, Inc., 294 North 12th St., Milwaukee, Wis. Oct. 6, page 512.

Indoor Oil Circuit Breaker

Type DR 60 indoor oil circuit breaker has all poles in one tank, totally inclosed mechanism, gasketed joint between tank



and frame, oil and gas separator and loop contacts. It is furnished three-pole, manually or electrically operated, for 600 and 1,200 amp., 15,000 volts, with an estimated interrupting capacity of 6,000 amperes.

Condit Electrical Manufacturing Corporation, 842 Summer St., Boston, Mass. March 24, page 495.

Breaker Improved Oil Circuit

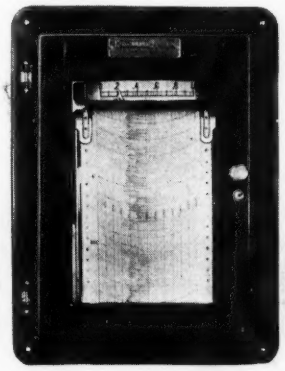
Embodying such features as all poles in one tank, totally inclosed mechanism, oil and gas separator, and expulsion-type contacts, Type DR 140 indoor oil circuit breaker is furnished three-pole, electrically operated, for 600, 1,200, 1,600 and 2,000 amp. at 15,000 volts, and 3,000 amp. at 7,500 volts. It is also furnished manually operated in the lower ampere capacities.

Condit Electrical Manufacturing Corporation, 842 Summer St., Boston, Mass. Sept. 15, page 407.

INSTRUMENTS, RELAYS AND TEST EQUIPMENT

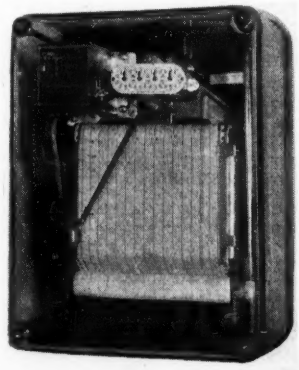
Flush-Type Graphic Instruments

Designed to require minimum switchboard space and at the same time give complete and easy access to all the mechanism from the front of the case, this instrument is furnished in single- and twin-type cases. The terminals for connecting to the instrument are mounted in bakelite moldings which extend through openings in the back of the case. The standard mounting for the multiplier is on the back of the instrument case, but where specified it can be furnished for separate mounting.



All instruments are furnished with illuminated scales and charts, and chart speeds of ¾, 1½, 3, 6 and 12 in. per hour can be furnished.

Esterline-Angus Company, Indianapolis, Ind. Nov. 17, page 722.



Recording Demand Watt-Hour Meter

Type RB meter consists of a watt-hour meter register containing gears for driving the four integrating counters and causing the pen to advance across the chart a distance proportional to the kilowatt-hours consumed during the interval for which the meter is set. At the end of this interval the pen is automatically released from the driving mechanism and swings back to the zero position, where it is again meshed with the gear train ready to advance during the next interval. A record of kilowatt demand taken at periods of desired length (usually between 5 and 60 min.) is obtained.

Westinghouse Electric & Manufacturing Company. Oct. 6, page 513.

Meter for Illumination Intensities

Model 603 Illuminometer is designed to indicate illumination intensities. It consists of an indicating instrument and a light target assembled in a portable case. The light target, or searching unit, has two

Photronic cell units which convert light energy directly into electrical energy without the use of batteries or other auxiliary voltage.

There are three ranges on the instrument, namely, 10, 50 and 250 foot-candles. A range-changing switch is provided for selecting the desired scale. Light may be read from all angles and the light target may be placed in relatively inaccessible places.

Weston Electrical Instrument Corporation, Newark, N. J. Jan. 19, 1932, page 112.

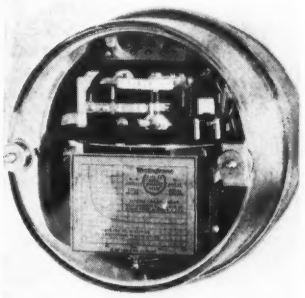
Photo-Electric Lighting Control Relay

When the intensity of daylight increases to a certain point this device operates to turn on electric lights; and, conversely, when the natural light increases to a certain intensity it causes the lights to be turned off. The operation of the relay is affected by variations in the intensity of light falling on a photo-electric tube. These variations produce proportional changes in the amount of current passing through the tube; and this changing current, amplified in a specially designed tube, energizes a primary relay controlling an auxiliary contactor, which, in turn, operates the main contactor controlling the lighting installation.

Westinghouse Electric & Manufacturing Company. Nov. 10, page 688.

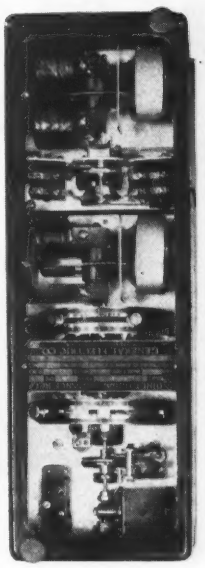
Induction Relays

Inspection of Type CO relays has been facilitated by making the glass cover and the metal case both removable; the new contacts are more accessible and more conveniently adjusted. The 4-to-12 and the 4-to-16 ranges have been combined and superseded by styles having a range of 4 to 15 amp. The operation indicator has been improved in action and operation, and by means of a slight change in the wiring connection it may be set to operate on trip-



ping currents of either 0.2 or 2 amp. All power-directional relays are available with directional control.

Westinghouse Electric & Manufacturing Company. March 17, page 458.



Directional Distance Relay

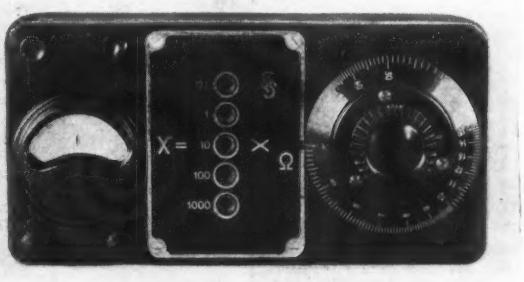
The directional distance relay is applicable to single and parallel transmission lines for rapid protection against phase-to-phase, three-phase and double-ground faults. It comprises a starting, an ohm and a timing unit. The starting unit indicates that there is a fault, the ohm unit indicates where the fault exists, and the timing unit sets the time in which the relay trips the oil circuit breaker which isolates the fault.

General Electric Company. Nov. 17, page 723.

Small Measuring Bridge

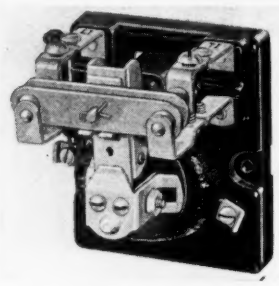
Type Z measuring bridge, which is made in two sizes, 10,000 and 50,000 ohms, has small over-all dimensions and weighs about 3 lb. Current for operating the instrument is supplied from a battery contained within the casing; thus the instrument can be used where the required low voltage is not available. It may be used in either a horizontal or vertical position.

Herman H. Sticht, 15 Park Row, New York City. Jan. 12, 1932, page 76.



Single-Pole Contactors

Bulletin 201 Form D (direct current) and Bulletin 701 Form D (alternating current) contactors are provided with "down" or "back" contacts, against which a single-pole contactor arm is held when the operating



coil is not energized. When the coil is energized the circuit is opened.

Bulletin 201 Form C and Bulletin 201 Form E contactors also available are two-wire, single-pole units. They are provided with a double set of single-pole stationary contacts and a double contactor.

Allen-Bradley Company, 1311 South First St., Milwaukee, Wis. Oct. 6, page 513.

Portable Current Transformer for Testing

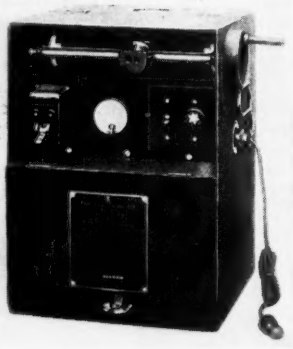
Type PRI portable current transformer has ratings up to 1,100 amp. in a series of eleven steps. It is suitable for use on

2,500-volt, 25-to-125 cycle circuits. It measures 3⅜ in. x 9¼ in., with a height over terminals of 9⅞ in., weighing only 13 pounds.

General Electric Company. July 21, page 106.

Portable Transformer Oil Test Set

Safety has been insured in this test set by inclosing all high-potential parts and by locating the oil cup in a compartment equipped with a switch



which functions to open the power circuit when the lid is raised. The cover to this compartment is also fitted with a glass window to permit visual inspection of oil during a test.

An improved voltage regulator is used which makes possible the smooth increase in test voltage from zero to maximum at a rate of approximately 3 kv. per second. The set employs a 30-kv. testing transformer with a rating of 0.5 kva. on 110-volt., 60-cycle power circuits.

American Transformer Company, 178 Emmet St., Newark, N. J. June 16, page 971.

Device Locates Hidden Ducts and Outlets

The "Nepeoduct Divinator," is employed to locate existing outlets that are hidden by floor covering or buried in concrete. The ear readily recognizes the characteristic sounds made by the mechanism as the instrument is carried along the floor. When the divinator crosses conduit a definite sound is transmitted to the headset and when the instrument is over an outlet a distinctly different sound is made.

National Electric Products Corporation, Fulton Bldg., Pittsburgh, Pa. June 30, page 1045.

Portable Testing Kit

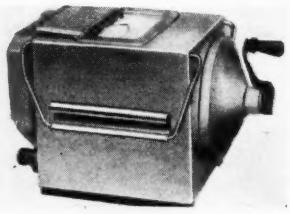
Opening with a flick of the thumb, the transformer snaps tightly closed, encircling the line wire. An ammeter, of the AS-3 type, is normally supplied, but other instruments of the same type, single- and double-rated ammeters and single-, double- and triple-rated voltmeters, are available.

By using one turn of the line through the transformer, the ammeter indicates directly on the scale the actual current in the line. When it is desired to measure current lower than could normally be read directly on the scale, there are two turns through the transformer. The ammeter then indicates double the current in the line. This method can be carried further by increasing the number of turns through the transformer. This kit obviates the need of disconnecting the leads or opening the circuit under test.

General Electric Company. April 21, page 643.

1,000-Volt Insulation Tester

The "Super-Meg" for testing 440- and 600-volt equipment at a potential (1,000 volts) definitely higher than the working voltage is similar in construc-

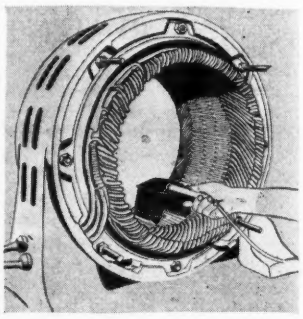


tion to the standard 500-volt insulation tester, but is slightly larger and heavier. It measures 5½ in. wide, 6¼ in. high and 9⅛ in. long and weighs 9 lb. The drive mechanism has the slip-clutch device. The indicating portion of the instrument is a true ohmmeter and is not affected by the exact value of the voltage applied. Used on 220- and 110- and lower-voltage apparatus the instrument provides a combined insulation-resistance and high-potential test.

James G. Biddle Company, 1211 Arch St., Philadelphia, Pa. April 14, page 602.

Growlers for Testing Electrical Equipment

Locating "shorts," "grounds," and "opens" in armatures, stators and coils is the function of

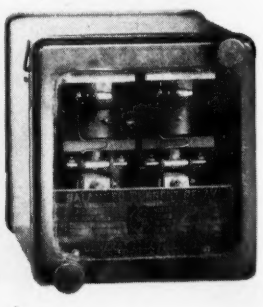


this device. It is essentially an open magnetic circuit transformer with primary only (the wire on the iron core of the armature or stator coil acting as secondary when the magnet circuit is closed). The internal type is made in two sizes, hinged at the top. It can be used on stators with openings from 5½ to 60 in. in diameter. The external type is made in five sizes for armatures from ¾ to 30 in. in diameter. It is hinged at the bottom and the armature under tests is laid directly on the pole pieces of the growler.

Ideal Commutator Dresser Company, 1053 Park Ave., Sycamore, Ill. Aug. 18, page 251.

High-Speed Relays

Designed to operate in 0.008 sec. to assist in clearing a phase-to-phase or ground fault, this relay makes use of voltage restraint and allows operation at well below full-load current of the circuit. It also permits the switching of individual trans-



mission lines without the usual special operating rules.

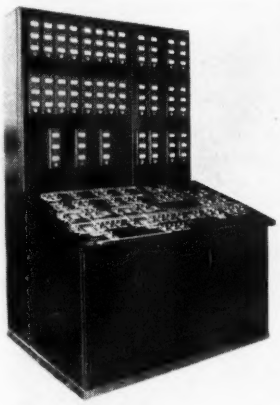
It comprises two balanced-beam units mounted in a rectangular case. Under normal conditions the relay contacts are open. Under faulty conditions the pull of a current-operating coil in the faulty line exceeds the pull of its voltage restraint by closing the contacts to trip the breaker of the faulty circuit. The contacts are then sealed closed by the holding coil.

General Electric Company, Schenectady, N. Y. April 14, page 604.

SWITCHBOARDS AND SWITCHGEAR

Desk-Type Miniature Switchboard

These miniature switchboards are designed for two classes of service: for local control of

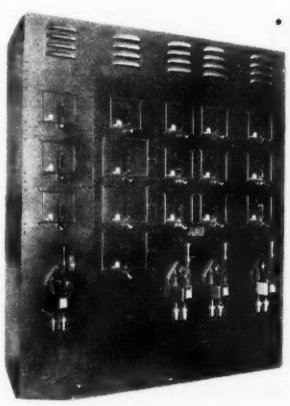


generating plants and substastations, and for control over extended distances by means of telephone cable. In addition, miniature switchboards are suitable for centralized industrial control, where it is necessary to place the control of a large number of manufacturing or process units under the direction of one operator. The functions are essentially the same as the conventional switchboard, consisting mainly of circuit breaker controls and indications, provisions for synchronizing, control and indication of electrically operated disconnecting switches.

Westinghouse Electric & Manufacturing Company. Oct. 20, page 582.

Dead-Front Steel Inclosed Switchboard

The switches incorporated in this dead-front, totally steel-inclosed switchboard have ball

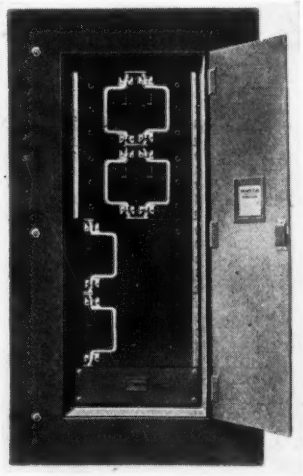


bearing guides, which permits full floating positive contact and insures simultaneous double break. The switch is a self-contained unit of compact design, embodying separate fuse and switch compartments interlocked for safety in replacing fuses. The standardization of these boards provides for the interchangeable mounting of the ball-bearing switches for all polarities, capacities and voltages.

Bull Dog Electric Products Company, 7610 Jos. Campau Ave., Detroit, Mich. July 28, page 140.

Shallow-Type Safety Panel

Employing cabinets only 6 in. deep and 19 in. wide, which can be supplied for flush or surface mounting, this shallow-type safety panel is equipped with self-adjusting trim clamps similar to those used on Square D lighting panels. Combination



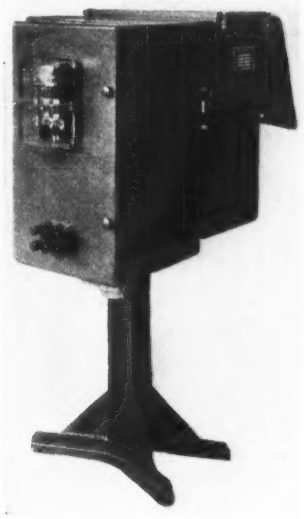
panels, including regular bakelite lighting panel sections, can be built up for applications where a combination power and lighting panel board conserves space.

Twin units are convertible between 30 and 60 amp., 125 or 250 volts, while the single units are convertible for 30-60-100 amp. fuse clips, 125 or 250 volts.

Square D Company, 6060 Rivard St., Detroit, Mich. Sept. 15, page 407.

Switchgear for Station Auxiliaries

Particularly designed for controlling motors of auxiliary equipment, such as circulating-

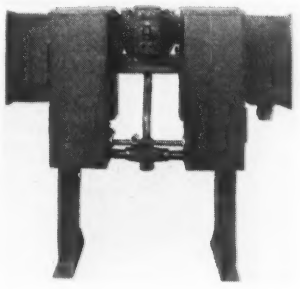


water pumps, ash-sluice pumps, coal-crusher equipment, deep-well pumps, ventilating and draft fans, etc., this solenoid and manually operated circuit breaker is equipped with current transformers mounted in a compartment.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Sept. 8, page 370.

Auxiliary Metal-Clad Switchgear

Suitable for power distribution, controlling station auxiliaries, across-the-line motors or similar services, this metal-clad switching unit consists of two 600-amp. electrically operated three-pole oil circuit breakers mounted on a steel frame and complete with current transformers and cable compartments. The breakers are mechanically and electrically interlocked so that both cannot be in circuit at the same time. Conveniently mounted on the



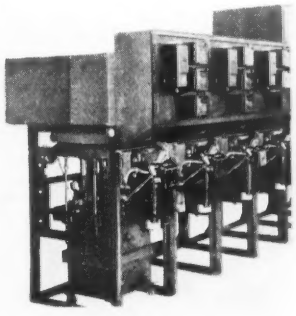
front is a control panel with switches and indicating lamps.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Nov. 17, page 723.

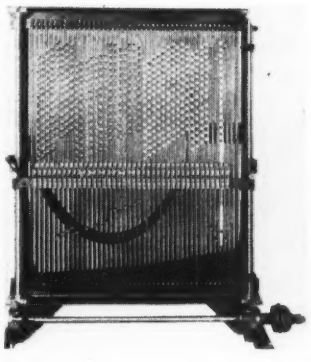
1,200-Ampere Metal-Clad Switchgear

Type M1-3 metal-clad switchgear accommodates oil circuit breakers having an interrupting capacity of 65,000 kva. at 7,500 volts, and is available in normal ratings up to 1,200 amp. The units can be furnished with manual, solenoid or motor-operating mechanisms. The switchgear embodies such features as small over-all dimensions, inclosure of live parts, easy installation and quick withdrawal and replacement of breaker units.

General Electric Company. Nov. 3, page 654.



ELEVATOR AND MISCELLANEOUS EQUIPMENT



Pre-Register Signal System for Elevators

With this pre-registering signal system there are the usual up and down signal buttons at the landings and signal lanterns over each hoistway door.

In each car is a panel on which there is a button for each floor. The operator presses the buttons corresponding to the floors called by the passengers when entering the car. When a button is pressed it is held in the closed position, completing

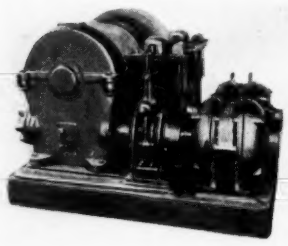
a circuit to a selector commutator in the control room. The commutators for the floor stops, the floor lanterns, night annunciator, car-position indicator and other operations are assembled in a single unit. Vertical commutators of the straightline double-screw type are used, except when the car speed is slow and the segment requirements are such that a standard friction-reversing commutator may be used. The commutator is driven from the elevator's secondary sheave by a chain and sprockets. Stop nuts are assembled and locked on the screws and a friction stud is used on the drive shaft, so that the position of the brushes on the commutator will be corrected at each end of travel if necessary. Small pressed-steel "H" sections form the supports for the segments, which are inserted between and insulated from them. This arrangement allows any desired assembly of the segments.

The brushes that pass over the segments during travel are of the roller-contact type and are adjustable both vertically and horizontally. Connections are taken from the brushes by flexible rubber-covered traveling cable to a stationary terminal box at the rear.

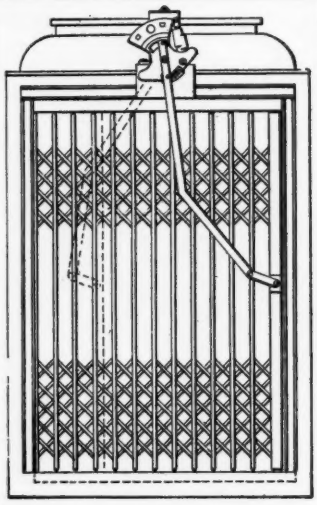
Elevator Supplies Company, Inc., 1515 Willow Ave., Hoboken, N. J. Sept. 15, page 391.

Duplex Elevator Uses Standard Motors

One of the principal features of the Duplex elevator is the use of low-cost, single-speed, high-speed, squirrel-cage alternating-current motors. The elevator consists of two complete hoisting machines combined in one unit which drives a traction sheave through differential gears. A range of car speeds is provided from full through half to slowest, which gives a precision leveling speed as slow and positive as variable voltage. Either complete hoisting machine alone can operate full load at half speed and either machine can be repaired without interrupting the regular elevator service.



Watson Elevator Company, 407 West 36th St., New York City. June 16, page 970.



Electric Operator for Elevator-Car Gates

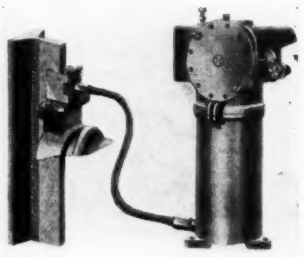
The electric operator for collapsible gates and light-weight sliding car-door panels consists of a double spur-gear reduction inclosed in an aluminum housing. At the back of the housing a torque motor is mounted and at the front of the housing is a sector plate with a section of internal gear at its top end. The section of spur gear meshes with a pinion on the output shaft of the reduction gear. Two adjustable oil dashpots are arranged to cushion the movement of the car gate or door as it reaches the final closing position in either direction.

The operator is mounted on top of the car and is connected to the gate by an operating arm and a link arrangement. The control may be arranged for automatic operation, so that the gate will open as the car stops at a landing, and after a predetermined interval it will close. It may also be arranged for push-button operation in the car or at a landing to close the gate before the car starts.

Elevator Supplies Company, Inc., 1515 Willow Ave., Hoboken, N. J. Nov. 17, page 722.

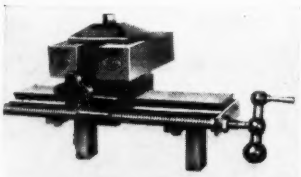
Lubricator for Elevator Guide Rails

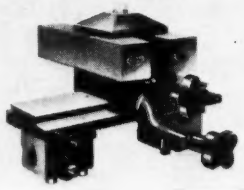
This inertia - pressure - type guide-rail lubricator consists of two parts. The upper half comprises a housing with a movable cap, the driving mechanism and a plunger or piston with its feed shaft. The lower part is a cylindrical grease container of proper size to receive the piston, together with proper fittings for the flexible metal hose headings to the distributor. The weighted lubricator cap is balanced by an adjustable spiral spring, so that it floats on its bearings sensitive to changes in acceleration. When the elevator is started or stopped the cap rocks up or down from its own inertia. This movement is transmitted in a positive direction to a driving wheel through two knurled rollers, one on the moving cap and the other in the housing.



Four of these lubricators, which weigh about 18 lb. each, are generally provided, one for each guide rail. Two are mounted on top of the car and two on the counterweight.

Westinghouse Electric Elevator Company, 1500 North Branch St., Chicago, Ill. Dec. 8, page 842.





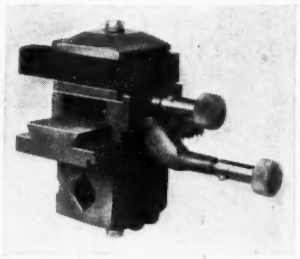
Improved Commutator Grinders

In the "Perfect" model grinder the location of the cross-feed screw has been changed from the center to the back of the bedplate. The head now rides on a solid plate instead of rails, and stone tools are held by one plate instead of two clamps as formerly used. The cross-feed handle of the lathe type has been substituted for one of the wheel type. Similar changes have been made to the "Ideal" model grinder. The rack has been placed at the back of the bedplate and a solid plate is now used in place of the rails.

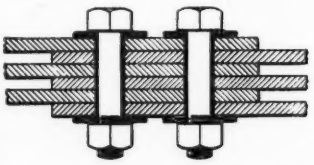
Ideal Commutator Dresser Company, 1053 Park Ave., Sycamore, Ill. June 23, page 1008.

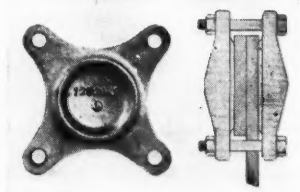
Small Commutator and Slip-Ring Grinder

The "Midget" grinder can be used on brush arms not sturdy enough to accommodate either the "Ideal" or "Perfect" grinders, as the weight and size has been kept down to a minimum. It is especially suitable for use in close quarters where the commutator or ring is not very accessible.



Ideal Commutator Dresser Company, 1053 Park Ave., Sycamore, Ill. Aug. 11, page 215.





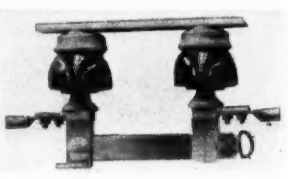
Steel Clamp and Expansion Washer for Electrical Connections

To maintain a constant contact pressure in buses and connections is the purpose of the steel clamp and expansion washers. The spring clamp is of non-magnetic steel, and the body is shaped so that it will distribute the contact pressure independently of the spring action of the bolting lugs. The expansion washer for use on bolted connections is placed under the head and nut of the bolt. The washers measure 1½ in. in diameter and are proportioned to give full tension up to the elastic limit of a regular ½-in. steel bolt.

General Electric Company. Nov. 10, page 688.

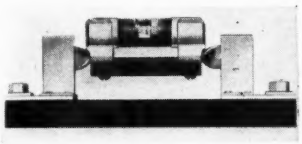
Disconnecting Switch With Double Locking

A distinguishing feature of this outdoor single-pole hook-



stick-operated, 4.5-kv., 300-amp. disconnecting switch for inverted mounting is the use of a positive safety lock on the blade and contact clip and a holding lock on the hinge end which firmly secures the blade in open position.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. Feb. 17, page 308.



Fuse Reducer for Standard Fuse Holders

To obviate the hazard of overfusing and to permit the installation of the proper size of fuse on any circuit without the necessity of changing the fused control switch or fuse block, this fuse reducer was developed. Made in several sizes for standard N.E.C. cartridge fuse holders for 250- and 600-volt spacing, these reducers give wide flexibility in the use of existing circuits.

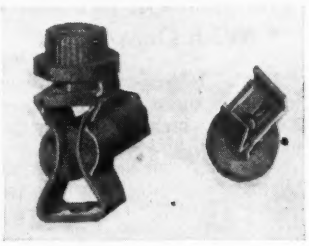
Ideal Commutator Dresser Company, 1053 Park Ave., Sycamore, Ill. June 30, page 1045.

General Utility Floodlight

Built for a standard 100-watt inside-frosted lamp, the utility floodlight has a sheet aluminum

combination casing and reflector. The front lens, 8 in. in diameter and of heat-resisting, clear, convex glass, is clamped against a gasket fitting in a groove in the reflector. A rubber-covered twin-conductor lamp cord is woven through a rubber bushing affixed to the socket-supporting cap to prevent entrance of moisture and abrasion of the cord. Vertical and horizontal adjustments are obtainable.

General Electric Company. March 31, page 529.



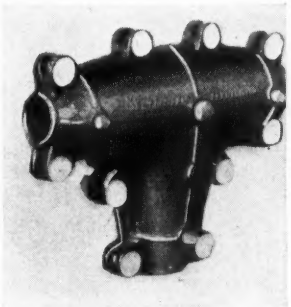
Fuse Clip Clamps

This clamp, intended to prevent fuses arcing and burning at contacts, is placed over the ends of the fuse contact, and by turning a knurled knob the contacts are drawn tightly against the fuse. They are made in three sizes: 30 amp., 250 volts; 30 amp., 600 volts; and 60 amp., 250 to 600 volts.

Ideal Commutator Dresser Company, 1053 Park Ave., Sycamore, Ill. Nov. 10, page 688.

Cable Splice Boxes

Splice boxes are furnished in plain gray iron, galvanized malleable iron or non-magnetic cor-



rosion-resisting aluminum alloy for heavy-duty alternating current. The design includes large clamping bolts with square locking shoulders; ribbed bodies for extra strength; and separate end compartments adjacent to central section, where armor or protective braid of cable can be terminated, each furnished with its own filling plugs.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. April 7, page 568.

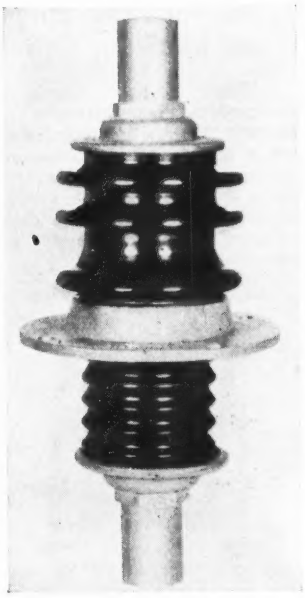
Test Clamps

Designated "Kliplok," these clamps have been especially designed for testing work, although they can be used for general applications, such as making temporary connections, signaling testing, meter and motor testing and other shop tests. All metal parts are cadmium-plated.

Trico Fuse Manufacturing Company, 1001 McKinley Ave., Milwaukee, Wis. Oct. 6, page 513.

Roof Bushing

This bushing is compound-filled, and is said to be free from corona inside the porcelain, even when flashover potentials are applied. It is of wet-process porcelain, with graded petticoats. Above the roof the



dry flashover is 80 kv., wet 55 kv. The portion below the roof has a dry flashover of 55 kv.

Delta-Star Electric Company, 2400 Fulton St., Chicago, Ill. March 31, page 531.

Motor Double-Sealed Ball Bearing

The balls and ball raceway of this bearing, now standard on all Red Band motors, are packed in congealed oil and completely sealed in a dustproof room at the point of manufacture. The seal, which consists of two plates—one on each side—is designed to prevent any injurious foreign material from entering the raceway in operation. The inside bearing chambers on the horizontal motors, or the lower bearing chambers on the vertical motors, contain no grease which can be forced into the motor. The totally inclosed feature of this bearing makes it easy to handle.

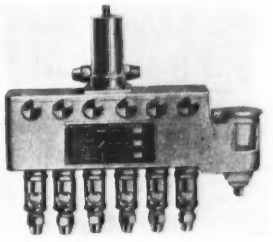
Howell Electric Motors Company, Howell, Mich. Sept. 15, page 406.

Oil Filters, Purifiers and Lubricating Systems

Multiple Oiler With Gravity Feed

Controlled amounts of oil varying from $\frac{1}{4}$ to 10 drops are delivered by this oiler to each bearing regardless of the viscosity of the oil, as long as it will flow through passages never less than $\frac{3}{16}$ in. Each oiler is made in eleven sizes having from two to twelve leads. It is possible to operate as many as a hundred oilers simultaneously by compressed air from a single source.

Operation can be by air, solenoid, electric motor, link connections to the machine being lubricated, or by hand. Timing devices can be set to operate the oilers at intervals of 6, 12 and 24 min. or up to any interval that is necessary. The timers may be driven by small electric



motors or may be belted to the machine being lubricated.

Gits Brothers Manufacturing Company, 1846 South Kilbourn Ave., Chicago, Ill. July 21, page 104.

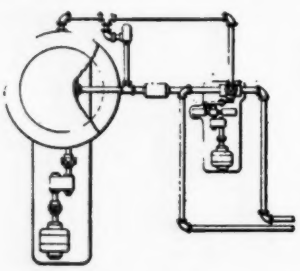
Inverted Glass Bottle-Type Lubricator

Advantages of automatic lubrication with visibility of oil supply is provided by the "Glaswick" oil cup, consisting of a steel cup with a shut-off cock in the shank and a glass bottle which fits over the top of the cup. When placed in service, the steel cup is filled with oil. The glass bottle is also filled and inverted over the steel cup. The desired rate of feed is obtained by determining the number of strands of wick to be used, and the oil then feeds at a uniform rate without further adjustment.

Lunkenheimer Company, Cincinnati, Ohio. Dec. 22, page 913.

Improved Automatic Lubricating System

In the improved "Dualine" system one central pump is used in place of two, and the controls have been simplified. Delivery of lubricant to one supply line loads all the valves with a measured quantity and delivery of grease to the other



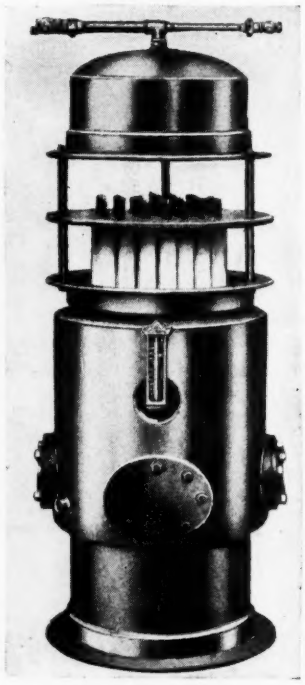
supply line discharges the measured quantity from each valve into its bearing at high pressure. Delivery of lubricant to both of the supply lines is controlled by a four-way hydraulic reversing valve, either electrically or manually operated.

When the valve is electrically operated, the operation of the motor is controlled by means of an electric clock and the frequency of the cycle of operation can be at an interval from two minutes to two hours.

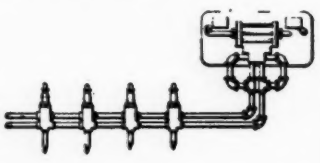
Lubrication Devices, Inc., Battle Creek, Mich. June 23, page 1009.

Filter for Lubricating and Insulating Oils

Adapted to the removal of fine carbonaceous matter, water and other impurities from lubricating oils and the reconditioning of insulating oil, this filter consists, essentially, of one or more columns of paper disks mounted on a square rod or



rods and compressed together under a spring tension of 80 lb. The paper disks are approximately 0.004 in. thick and the minute space between the disks, together with the inequalities of the paper surfaces, form extremely fine passages through which the oil is forced under pressure or drawn by vacuum. The oil flow is from the outside



of the disks to the spaces around the square rod. Thus the impurities in the oil form a layer or cake on the outside of the pack.

Oliver United Filter Corporation, Inc., 33 West 42d St., New York City. Jan. 26, 1932, page 147.

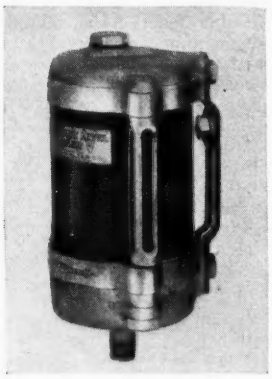
Electrical Oil Reclaimer With Dehydrator

In the Unipass oil reclaimer, incoming dirty oil first enters a strainer which removes foreign matter and the larger globules of water. From the strainer the oil passes through an electric heater where the temperature is raised to approximately 120 deg., then to a dehydrating chamber maintained under a vacuum of 28 to 29 in. In this chamber the oil is dispersed in such a way that any entrained water is readily evaporated at the reduced boiling point. The watery vapor, together with other gases, is expelled directly to the atmosphere through a discharge on the vacuum pump.

After dehydration the oil collects in a sump, from which point it is pumped to an all-metallic filtering unit designed to remove all suspended and sedimentary matter in a single pass. Each twin plate of the filtering element is divided equally into six twin segments, and in operation one segment of each plate is automatically backwashed free of sludge while in the bottom position. All moving parts of the reclaimer, including oil pumps, vacuum pump agitation and dehydrator disks, are driven from a single meter.

This unit is claimed to render oil anhydrous and of high dielectric strength in a single pass; render oil gas-free, including dissolved air and gases; reduce the organic acid content of serviced oil without introducing water or chemical solutions into the oil; and reduce the soluble and non-soluble matter. To insure thorough cleansing when treating switch oils a pre-coat of porous filter-aid is applied to the surface of the filter plates. This operation requires about three minutes.

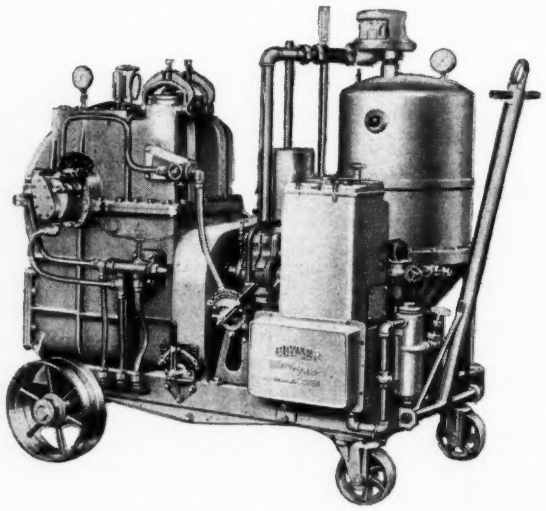
S. F. Bowser & Company, Fort Wayne, Ind. Jan. 26, 1932, page 145.



Oil-Level Control for Machine Bearings

Consisting of a reservoir with gage to show height of oil, this oil-level control is mounted on the machine or at some convenient point adjacent thereto. From the bottom of the reservoir a pipe is led to each of the bearings in which the level is to be controlled. The oil may be piped in any horizontal direction and can feed one or several bearings on the same level. Reservoir capacities range from ½ pint to 2 gallons.

Duan-Walter Company, 3343 East Water St., Milwaukee, Wis. April 21, page 643.



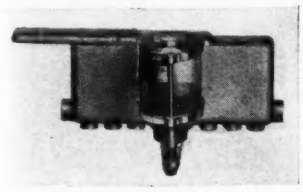
Gear Lubricants

Known as S.A.E. extra-pressure lubricants, these are available in either oil or grease form, ranging in viscosity from 100 sec. at 100 deg. F. to 350 sec. at 210 deg. F. with a pour test for the lower viscosities as low as minus 40 deg. F. They are especially suitable for high-speed bearings, speed reducers and other gears.

D. A. Stuart & Company, 2727 South Troy St., Chicago, Ill. Oct. 20, page 583.

Adjustable-Wick Oil Feed

For controlling the amount of oil delivered from a reserve supply to various types of bearings, this device employs a constant-level oil control and an adjustable oil-feed multiple unit. The wick box is made in 4, 8 and 12 outlet units, providing



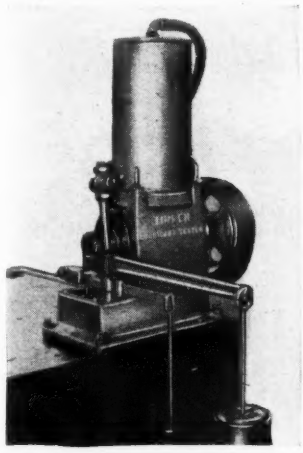
lubrication for a like number of bearings. The horizontal outlets, on each end of the box, enable the hooking up of other wick units when located on the same level.

Daun-Walter Company, 3343 East Water St., Milwaukee, Wis. June 30, page 1046.

Apparatus for Testing of Lubricants

In addition to showing the effects of different lubricants on certain types of transmissions, this machine gives the relative efficiency of different bearing metals under various conditions of load, speed and temperature.

The mandrel by means of which the test is made is mounted in two anti-friction bearings arranged to hold it rigidly in alignment. The test block is a small piece of metal about ½ in. square by ¾ in. long hardened to Rockwell C-60 and



ground. It is inserted in a notch in the loading lever and held in place by a wedge. If bearing metals are to be tested, the test block or the cup, or both, may be made of the appropriate material.

Timken Roller Bearing Company, Canton, Ohio. Feb. 17, page 308.

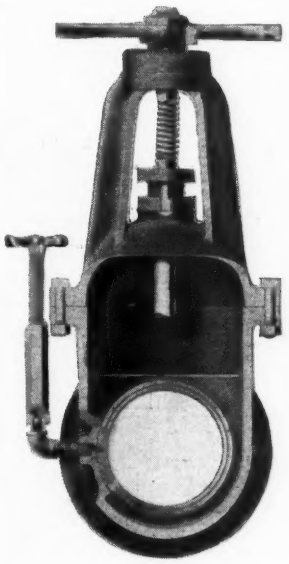
Piping, Valves, and Welding Fittings

Gate valves with lubricant seals, oil-pressure-operated turbine-bleeder-line non-return valves and welding fitting in a variety of sizes and shapes are now available

Gate Valves With Lubricant Seal

Use of a lubricant seal between the seating surfaces characterizes the Lubrotite line of gate valves. The lubricant is introduced around the sealing surface by a groove or duct in each side of the seat ring and a series of interconnecting holes. It is forced through the ducts by a screwed plunger on the side of the valve.

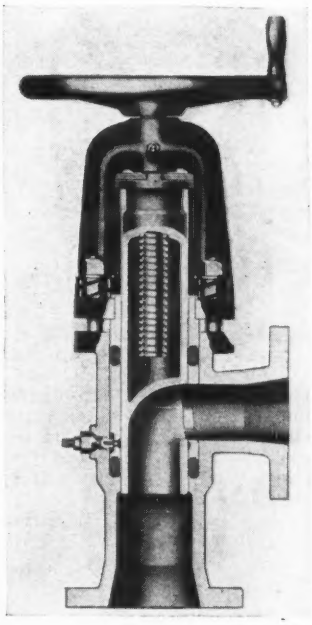
Among the claims made by the manufacturer are that the



valve is sealed tight even though the seating surfaces may have become damaged by scratches, deposits or corrosion in the line. Sealing surfaces do not become corroded or scratched as easily as non-lubricated surfaces, frees wedge that has become set from long period of service, and reduced wear on valve.

The valve is made in standard and extra-heavy iron body patterns and in cast steel and is interchangeable with non-lubricated valves. It is suitable for use on boiler-feed lines, blowoff lines, water systems, paper mill service and similar applications.

Reading-Pratt & Cady Company, Inc., Bridgeport, Conn. Dec. 1, page 808.



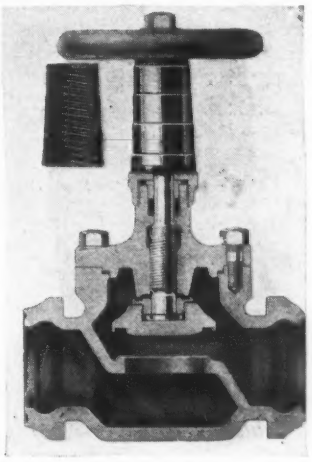
Seatless Valve for General Service

Type P valve for general service incorporates the important features of the Yarway blowoff valve. The harder the handwheel is turned after the valve is closed the tighter the valve becomes, as a shoulder on the yoke of the sliding piston contacts with the upper follower gland, forcing it down and compressing the packing rings both above and below the port opening. Springs are provided on the bonnet studs to maintain constant pressure on the packing. The valve is made in sizes from ¾ to 10 in. of various metals, including iron, steel, stainless steel, acid bronze, stainless steel, acid bronze.

Yarnall-Waring Company, Mermaid Ave., Philadelphia, Pa. Sept. 22, page 440.

Valve Stem Protecting Shield

This shield is designed to protect the valve stem from dust and grit, and to lubricate it effectively, thus increasing the

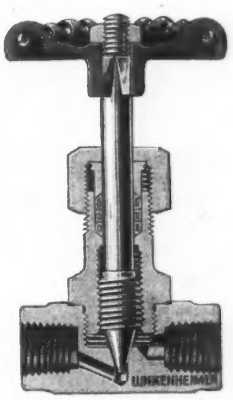


life of the packing and insuring an easily operated valve. Furnished in brass or aluminum, the shield is made up of three, four, five or six sections, resembling somewhat a collapsible metal drinking cup. The sections are held in place by an internal spiral spring which allows the shield to follow the opening and closing of the valve and at the same time holds it securely against the sealing washer at each end. The shield is available in valve stem sizes ranging from ⅜ to 1½ in. and in a variety of lengths.

York Ice Corporation, York, Pa. May 12, page 754.

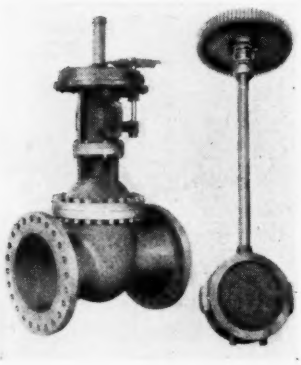
Steel Needle Valves for High Pressure

Two lines of steel needle valves designed for gas or liquid services in pressures up to 3,000 lb. at 150 deg. are now available. The valves are identical in design, with steel body, hub, stem, stuffing box and gland. One line has



a bar-steel body and is parkerized, and the other has a stainless-steel body and is intended for use where corrosive fumes are present. Both patterns are made in ⅛-, ¼-, ⅜- and ½-in. sizes.

Lunkenheimer Company, Cincinnati, Ohio. Dec. 1, page 809.



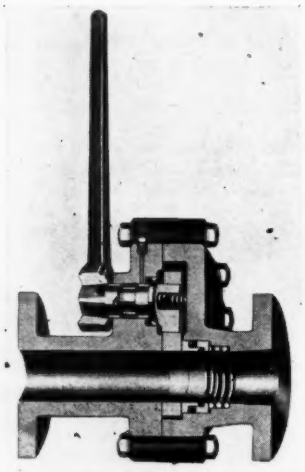
Ball Thrust Bearing Gate Valve

Ball thrust bearings are used in this gate valve designed for 600 lb. gas pressure. The disk and the gate are of high-carbon steel and seat faces of nitralloy. The two ball thrust bearings are totally inclosed within the valve housing. In a 16-in. valve the measurement from face to face of flanges is 48½ in. and the total lift 12 inches.

National Machine Works, 1559 Sheffield Ave., Chicago, Ill. July 14, page 67.

Lever-Operated Valve

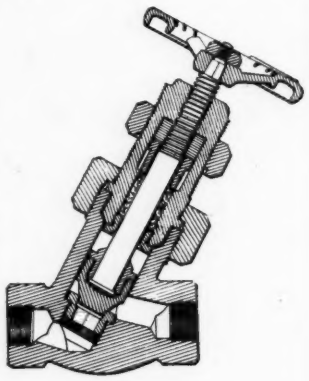
Yarway "Pretite" valve is especially suitable for use in the chemical, paper, rubber and other industrial process systems. It is fitted with a one-piece solid disk with a seating surface on both sides. The disk is in contact with its two seats during the opening and closing cycle, a seating bushing, spring-packed, being used on the inlet side. It is made in iron, steel, stainless steel, acid bronze, aluminum and special metals. Sizes range from ½ to 4 inches.



Yarnall-Waring Company, Mermaid Ave., Philadelphia, Pa. July 28, page 141.

Forged-Steel Valves for High Pressures

Globe, angle and check valves of forged steel especially designed for use on high-pressure steam lines and oil refinery work have been made available. Bodies and caps are of forged steel, and the working parts may be of monel metal, stainless steel or nitralloy. The valves are made in various types—with union bonnet or flange bonnet and with swivel plug seat and disk or integral plug seat and disk. Sizes available range from ¼ to 2 in. for pressures up to 600 lb. and ¼ to 1 in. for pressures up to 1,500 pounds.



Chapman Valve Manufacturing Company, Indian Orchard, Mass. Dec. 8, page 843.

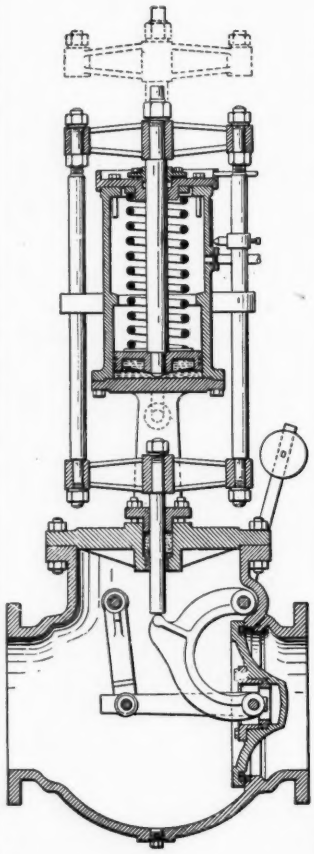
Bleeder Line Non-Return Valve

The disk of the Davis automatic non-return valve for use on turbine bleeder lines is free to close when a back flow of any kind occurs. In addition a positive means of closing the valve is provided by an oil power cylinder connected to the turbine lubricating system. The oil pressure holds the piston compressed against tension springs under normal operating conditions. When the trip mechanism of the turbine throttle valve operates, the oil pressure is released and the springs seat the disk. Sizes range from 2 to 24 in. of steel, semi-steel or cast-iron.

Davis Regulator Company, 2547 South Washtenaw Ave., Chicago, Ill. Oct. 6, page 512.

Bleeder Line Check Valves

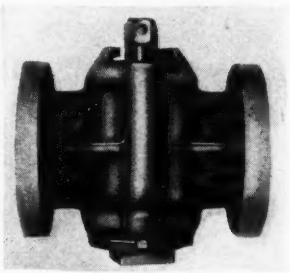
In a typical installation this valve is put into the bleeder line at a convenient point adjacent to the turbine. High-pressure oil for operating the closing piston is supplied from the main lubricating system of the turbine or from an independent source. In either case the oil is passed through a three-way valve connected to the emergency overspeed governor of the turbine. When this governor operates, the oil-trip valve relieves the oil pressure from below the piston, and the spring in the valve cylinder closes the bleeder valve. The valve is made in two styles: sizes up to 12 in. have the flapper disk with single link suspensions, while sizes above 12 in. have parallel-motion disk.



Schutte & Koerting Company, 1150 Thompson St., Philadelphia, Pa. March 24, page 495.

Lubricated Plug Valve

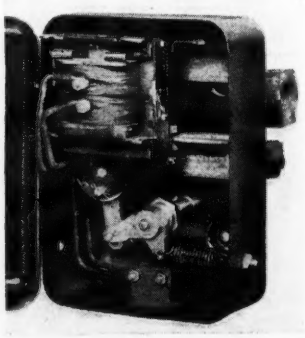
Offered for use on water, steam, boiler blowoff, oil, gasoline and chemical lines, the "ACF" Milliken valve can be furnished in sizes from 1 to 8 in. and for pressures of 125, 175 and 250 lb., also in the Venturi type for 500 lb., both in screwed and flanged models. It has the same face-to-face dimension as standard flanged gate valves and opens and closes with a quarter turn, having a positive stop. It is also available in aluminum and acid-resisting bronze in sizes up to 3 in., as well as in other metals to suit various purposes. A lubricant chamber is provided on the side of the valve and pressure is applied by means of a screw. The lubricant is forced into a chamber below the plug, from which it raises through four vertical ducts, where it seals the top of the plug against leakage.



American Car & Foundry Company, Valve Division, 30 Church St., New York City. May 19, page 792.

Solenoid-Operated Valve

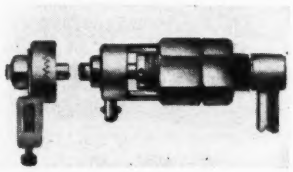
Some of the uses for which this solenoid-operated valve is designed are: controlling the flow of brine through cooling pipes in cold-storage rooms, the supply of oil or gas to furnaces, the flow of various liquids and the flow of water in cooling jackets of compressors.



The seat and poppet are ground to fit, and only materials suitable for liquid or gas that is to be controlled are used. A standard solenoid is em-

ployed, and all of the coils are designed for continuous duty. The solenoid plunger is permitted to accelerate without load for a fraction of the stroke to effect quick operation.

General Electric Company, Schenectady, N. Y. Sept. 22, page 441.



Ball-Bearing Stuffing Box

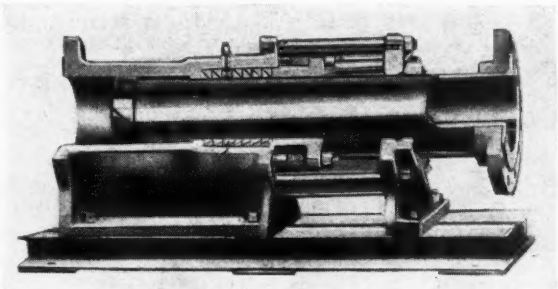
Stainless steel is used in the stem, nut and body of this ball bearing stuffing box now being furnished on all Fisher float cages and rotary lever valves. Combination radial - and - thrust ball bearings offer a good support for the float stem, reducing side throw or motion. Positive liquid seal in the lantern ring eliminates the possibility of air being drawn into the system when it is used for vacuum service. By changing to a screw plunger grease fitting the stuffing box can be converted to a lubricated unit.

Fisher Governor Company, 1404 Fisher Bldg., Marshalltown, Iowa. Aug. 11, page 214.

Heavy-Duty Expansion Joint

A feature of the Murfco expansion joint is an extension guide rigidly attached to the body of the joint proper. The extension precludes any chance of misalignment and increases the life of the packing. Standard pressure fittings lead a charge of zinc oxide lubricating compound under pressure through a metal distributing ring, forming the lubricant into a thin film between the packing and sliding sleeve. The complete joint is mounted on a structural-steel base.

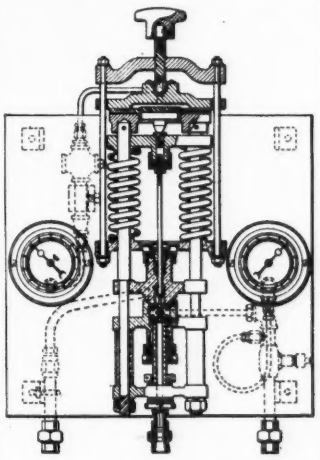
Murphy Machine Company, Witherspoon Bldg., Philadelphia, Pa. June 23, page 1008.



Relay Pressure Valve

Style G relay valve, designed for pressure control of steam, water or gas lines, controls the pressure within close limits by regulating the movement of a sylphon-operated or piston-operated throttle valve.

The controlled pressure serves to actuate a diaphragm against the force of springs. A motive pressure of air, water or steam at 150 lb. gage or over is connected below a small valve and to the sylphon or piston-operated regulating valve. The pressure

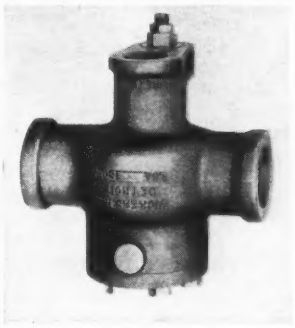


which exits in the line depends upon the position of the small valve between duplicate ports. By changing the seat gap it is possible to obtain any desired speed or lag in the amplified pressure connection. The valve can be used to operate a single valve or a series of valves or pistons.

Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. Jan. 19, 1932, page 112.

Balanced Hydraulic Relief Valve

A piston that is in hydraulic balance regardless of the initial oil pressure and the pressure for which the valve is set is used in place of spring-loaded construction in the Vickers relief valve. A hydrocone-shaped valve prevents wire-drawing and eliminates oil foaming. Turning an adjusting screw will vary the pressure from one extreme to the other.

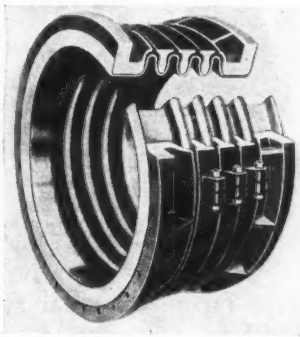


The valve is made in two sizes—for ¾-in. and 1¼-in. pipe connections. Their capacities are 0 to 15 g.p.m. and 10 to 40 g.p.m., respectively. The pressure range for both is from 0 to 2,000 pounds.

Vickers, Inc., 7760 Dubois St., Detroit, Mich. Aug. 11, page 214.

Corrugated-Type Expansion Joint

The important feature of this improved corrugated expansion joint is directed flexing. The contour of the equalizing rings



and the corrugations of the flexing member are matched so that the latter assumes the correct position at all pressures and temperatures, thus eliminating all localized flexing stresses. The flexing member is now made of Everdur metal.

Several styles of joints are available, including the standard type with flanged ends, welding-end type, single unit, and welding-end type double unit with service outlet between the joints.

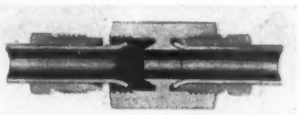
E. B. Badger & Sons Company, 75 Pitts St., Boston, Mass. Jan. 26, 1932, page 146.

Compression Fittings and Tubing

Brass, monel metal or steel compression fittings and copper or steel tubing are especially well suited for piping where many bends must be made in the line and where an absolutely tight installation is required for high-pressure and high-temperature service.

Double, extra-heavy brass fittings with extra-heavy soft annealed or half-hard copper tubing are available for pressures which do not exceed 800 lb. and where the intermittent temperatures are under 600 deg. For higher intermittent temperatures steel or monel compression fittings are recommended.

Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. June 30, page 1045.

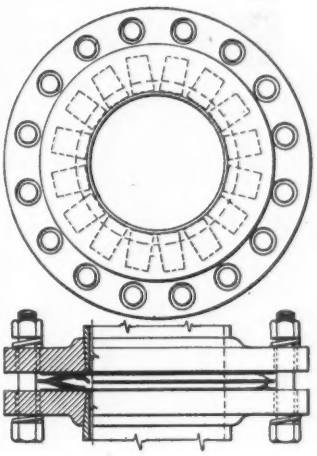


Gasket-Type Expansion Joint

Developed from the Dennis turbine-condenser joints of similar construction, this joint for pipe lines consists of a bellows-type gasket filled with properly designed springs. It is made to fit standard pipe flanges, the bolts of which use lock-type spring washers, and sufficient initial tension (cold) is produced to seal the joint. As the piping expands, the pressure on the gasket is increased, and the internal pressure also aids in sealing the joint.

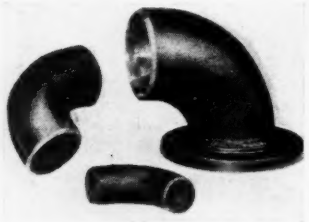
These gaskets are made in pipe sizes 3 in. and above for 125 lb. working pressure, and will take care of ¼ to ⅜ in. expansion axially, or lateral movement of same amount. The bellows is made of Duraloy steel, with suitable gaskets attached. When combined with a standard van stone joint it forms a swing-joint expansion element for use in heating risers and like applications. The joints are installed similarly to ordinary flange gaskets.

Thomas R. Heyward Company, South 26th St., Pittsburgh, Pa. Dec. 22, page 912.



Wrought-Iron Welding Elbows

"Weldells" are made in sizes from 2 to 12 in. and have the same radius and center-to-face measurements as standard-radius fittings. A tangent is formed on each end, making the elbows interchangeable with standard fittings, and the



ends are beveled 45 deg. for welding. Stock sizes include both standard and light-weight (10-gage) sections. The elbows are forged from wrought-iron plate, with a smooth internal diameter.

Locomotive Terminal Improvement Company, Chicago, Ill., and the A. M. Byers Company, Clark Bldg., Pittsburgh, Pa. Aug. 11, page 215.

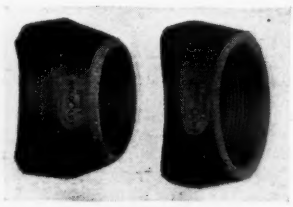
Pipe Fittings for Welding

Taylor seamless pipe fittings permit entire pipe systems fabricated by welding to be installed with the use of only circumferential welds. Elbows are made of the standard center-to-

end measurement of American standard extra-heavy screwed fittings. The ends are machine-tool bevelled, providing a smooth, clean surface for welding.

The tees are made to pipe thickness at the ends, with the body thickened up. The reducing nipples are designed especially for welding, with sufficient length to aid installation.

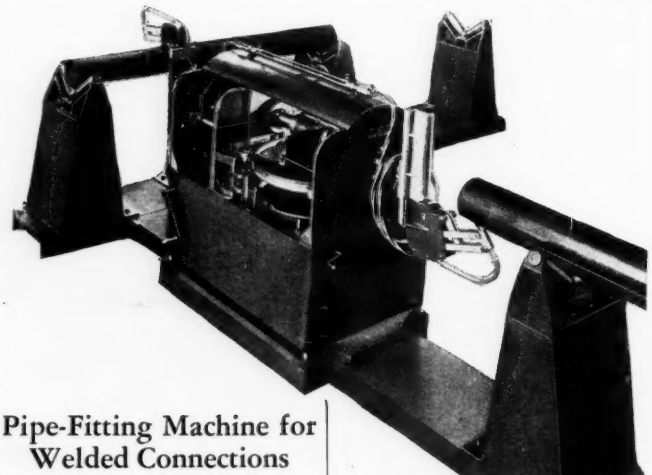
Taylor Forge & Pipe Works, 14th St. and 48th Ave., Chicago, Ill. July 14, page 66.



Welding Fittings for Branch Connections

Made in various pipe sizes from ½ to 10 in. to fit on pipe from 1 to 12 in., "Weldolets" and "Thredolets" are designed to be installed by simply welding them to the main line, using a fusion or vee-weld, then removing the button and completing the junction by welding or screwing the branch pipe to the outlet. The fittings are drop-forged and have a heavy external rib.

Bonney Forge & Tool Works, Allentown, Pa. June 16, page 970.



Pipe-Fitting Machine for Welded Connections

Clean cuts, correct bevels and uniformity of outline between the surfaces to be joined are the advantages emphasized for the use of the Douglass pipe-fitting machine. Designed to cut automatically by oxy-acetylene torch, pipe of 2 to 18 in. diameter for fabrication into welded tees, miter elbows and bull plugs, it also bevels plain end pipe for butt welds. The mechanical movement of the cutting torch is a combined rotating, longitudinal and angular motion. By the use of two heads on the machine the header pipe and the branch pipe may be cut simultaneously with the same generating mechanism, assuring a close fit of the two parts of the tee. By two simple adjustments a wide range of pipe sizes is taken care of.

Bevels produced by the machine conform to the standards of the American Gas Association and the Heating and Piping Contractors' National Association. All cuts, it is claimed, are made smooth and clean, free from oxide and scale, so that parts as they come from the machine require no further preparation for welding. Standard torch tips and torch valves are used. The latter are mounted on top of the machine, where they are easily accessible for adjustment.

H. A. Brassert & Company, 310 South Michigan Ave., Chicago, Ill.. Jan. 26, 1932, page 145.

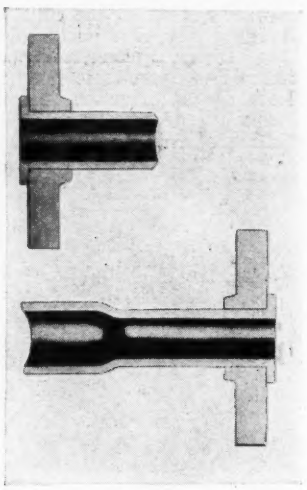
Welding Fittings

The welding ells included in this line are made from one piece of plate with one welded longitudinal seam along the inner circumference. They are made from the same material as mild steel pipe and so have the same coefficient of expansion and the same welding characteristic.

Made with a comparatively long tangent so that the circumferential weld to the pipe is entirely in tension and not subjected to shear and bending, the sleeve is used to reinforce a butt line weld between two lengths of pipe. It relieves the butt weld of bending stress and much of the tensile stress.

The saddle is designed for reinforcing the junction of the neck and body of a welded header.

Midwest Piping & Supply Company, Inc., 1450 South Second St., St. Louis, Mo. Nov. 3, page 655.



Loose-Flange Welding Stubs

Furnished in sizes as small as ½-in., Navco loose-flange welding stubs can be used in high-pressure drips, drains, by-passes, soot-blower piping and other small lines. The stub is made of length sufficient to prevent distortion of the lap when properly welded in the line. The laps are completely machined front and back and flanges are bored to give minimum clearance. Sizes from ½ to 24 in. are obtainable.

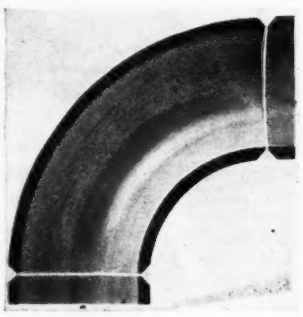
National Valve & Manufacturing Company, 3101 Liberty Ave., Pittsburgh, Pa. Sept. 1, page 338.

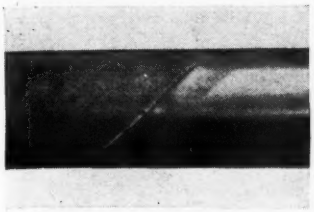
New Series Fittings for Pipe Welding

Like the former series put out by the company, the fittings included in this line are made seamless, with uniform wall thickness and radius. They are made with the same inside diameter and the same wall thickness and wall tolerance as the pipe with which they are used.

The complete line of fittings ("Tube Turns") now available includes 45- and 90-deg. elbows and 180-deg. return-type fittings for welding in sizes from ¾ in. to 20 inches.

Tube Turns, Inc., 1300 South Shelby St., Louisville, Ky. Jan. 26, 1932, page 148.





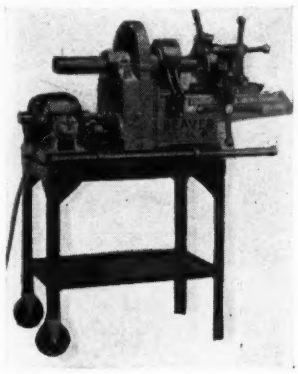
Spiral Welded Pipe

These pipe lengths are made of one continuous strip of metal wound spirally and welded along the seam; a slightly heavier weld than actually necessary is used to give the pipe unusual stiffness and rigidity. Sizes ranging from 6 to 24 in. in diameter in all wall thickness from No. 12 gage to $\frac{3}{8}$ in. are available. They can also be had with any type of coating desired—mill coat, asphalt inside and out, or galvanized.

American Rolling Mill Company, 703 Curtis St., Middletown, Ohio. June 23, page 1008.

Portable Pipe Machine

Beaver Model A pipe machine, designed to cut, thread and ream $\frac{1}{2}$- to 2-in. steel, wrought-iron, brass or cast-iron pipe, has three opening die heads that are adjustable for over, under or standard threads. The die head may be tilted back



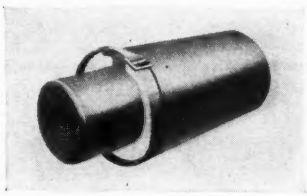
out of the way when cutting and threading up to 12 in., using a universal shaft and geared die stocks and pipe cutters. Bolt die heads can be furnished.

Borden Company, 350 Dana St., Warren, Ohio. Oct. 13, page 546.

New Packing in Coil Form

The base of this new packing is a metal which is said to resist corrosion from acids, alkalies and electrolysis and to withstand temperatures in excess of 1,200 deg. F. The metal-covered fibers are thoroughly lubricated and bonded together under pressure, forming a homogeneous packing. It can be used on hot and cold water; superheated steam; air and other gases; oil, sulphuric and other acids; ammonia, brine and carbon dioxide. It is available in sizes from $\frac{5}{16}$ in. to 1 inch.

Metalastic, Inc., Union City, N. J. Aug. 4, page 178.



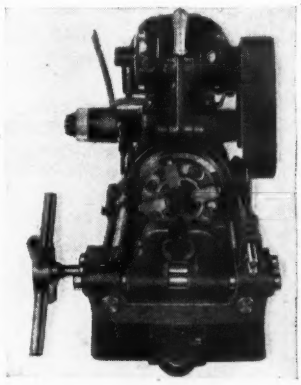
Pipe Insulation Support

With this support the covering is cradled in wide brass bands. Each band is hung from a saddle which passes through the insulation and rests directly on the upper surface of the pipe. This method of support keeps the insulation concentric with the pipe and prevents sagging. The supports are available in all standard pipe sizes up to 24 in., and for $1\frac{1}{2}$, 2, and 3 in. thick covering.

American District Steam Company, North Tonawanda, N. Y. Dec. 22, page 913.

Pipe Machine With Rotary Die Head

The regular pipe capacity of this rotary die head machine includes all sizes from $\frac{1}{8}$ to $1\frac{1}{4}$ in., with an extra capacity down to and including $\frac{1}{8}$ in. The regular bolt capacity is $\frac{3}{8}$ to $1\frac{1}{4}$ in. with an extra capacity of $\frac{1}{4}$, $\frac{5}{16}$, $1\frac{3}{8}$ and $1\frac{1}{2}$ in. It can be furnished either as a bolt threader or with special equipment to handle nipples. A stock-stop and an automatic trip which opens the die



head when the thread has reached desired length are additional features.

Oster Manufacturing Company and Williams Tool Corporation, 2095 East 61st St., Cleveland, Ohio. Oct. 27, page 619.

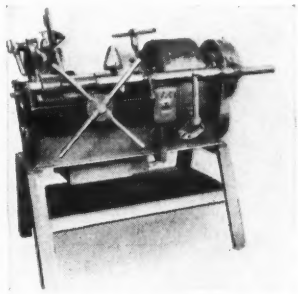
Rock-Wool Pipe Insulation

Gimco "Savall" rock-wool pipe insulation, suitable for temperatures up to 1,250 deg., is made entirely of rock wool without artificial binders. The insulation is formed into hinged sections of standard length and diameter.

Owing to the natural tendency of the resilient fibers of rock wool to intermingle, it tends to seal the joints where the ends of each section join and where the edges of the hinge and joint come together. It has sufficient elasticity to absorb the expansion and contraction of the pipe

without becoming loose. It is furnished in 36-in. sections in a wide range of pipe sizes and insulation thicknesses.

General Insulating & Manufacturing Company, Alexandria, Ind. June 2, page 897.

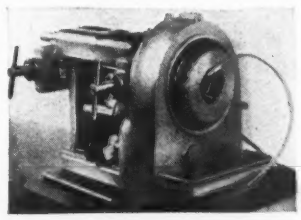


Power Pipe Machine

Power pipe machine, "Toledo" No. 1-2-4, has a frame of all-steel construction and is equipped with eight quick-opening die heads and dies—one for each size of pipe. The cutter head is of special design, with four high-speed steel cutter knives cutting simultaneously. The quick-opening die heads permit instant release of dies after threading.

The reamer is of the cone type, with single high-speed steel cutter blade mounted on an arm, which can be instantly swung into position for reaming. Six spindle speeds are obtained through one clutch lever and gear-shift. The machine occupies a space of 2 ft. 11 in. x 3 ft. 10 in. and its net weight is 1,750 pounds.

Toledo Pipe Threading Machine Company, 1445 Summit Ave., Toledo, Ohio. Dec. 1, page 808.



Portable Pipe Threader

Of compact design and weighing less than 190 lb., this machine will handle pipe in all sizes from $\frac{1}{2}$ to 2 in.

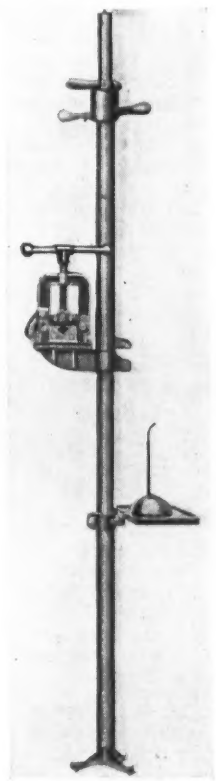
A standard square die is revolved on the pipe rather than revolving a length of pipe through a die head. This principle insures a straight thread and permits running thread on long pipe stands. The machine embodies such features as automatic feed, cutter head or reamer oil pump lubrication.

Axelson Manufacturing Company, Los Angeles, Calif. Dec. 8, page 842.

Portable Vise Post

This portable vise post is designed to be set up rigidly between the floor and ceiling and locked in position. A "feather touch" lock is incorporated which cannot become loosened but unlocks with a slight tap. The post is equipped with a vise stand and tool tray and has a tri-foot self-balancing base.

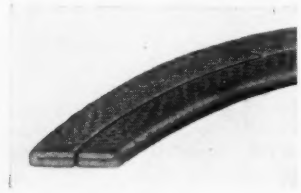
Armstrong Manufacturing Company, Bridgeport, Conn. Sept. 22, page 440.



Semi-Metallic Packing

J.M. No. 350 semi-metallic packing is suitable for use on steam, air, water, oil, etc., on rotating rods at high pressures and temperatures up to 500 deg. F. It is plaited up square from a combination of asbestos fiber and non-abrasive metal, the whole being thoroughly lubricated and graphited. A modified packing, No. 351, semi-metallic, is designed for use with gasoline and oils.

Johns-Manville Corporation, 292 Madison Ave., New York City. March 10, page 419.



Button-Hole Tape

As supplied, the button-hole tape contains no holes. These are made when the tape is applied by simply inserting a knife blade between the two parallel courses of the tape and cutting the bonding fabric to form a button hole which slips readily over the bolt or stud.

This construction gives a gasket that will lie flat and form a positive seal around each bolt. For joining the two ends of the tape a step joint is used. The tape is available in coils of any desired length and in all regular widths and thicknesses.

Garlock Packing Company, Palmyra, N. Y. April 21, page 642.

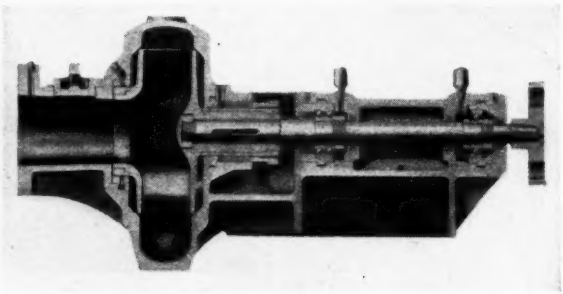
Steel Tubes With Cast Linings

One of the advantages of the construction of this steel tubing, lined with a variety of metals or alloys, is in the production of steel-backed bearings. Any specified thickness of bearing metal can be accurately controlled and tubes in lengths up to 16 ft. can be fabricated.

Detroit Seamless Steel Tubes Company, West Warren and Wyoming Aves., Detroit, Mich. June 23, page 1008.

Pumps for Power Plant and Industrial Uses

Unitype pumps for general service, clogless centrifugal pumps for material-laden liquids and clear-water-sealed units for abrasive materials



Pump for Liquids Carrying Solids

The "Clogless" pump is designed particularly for handling sewage, paper pulp and similar liquids. The suction nozzle is designed for a large suction pipe, insuring low pipe velocities and low total suction head. The passages through the impeller are extra wide, ordinarily only two vanes being used. Provision is made in the design for sealing with clear water under a pressure slightly higher than that generated by the pump. This prevents liquid and abrasive matter handled by the pump from entering between the rings.

DeLaval Steam Turbine Company, Trenton, N. J. Aug. 11, page 214.

Industrial Centrifugal Pump

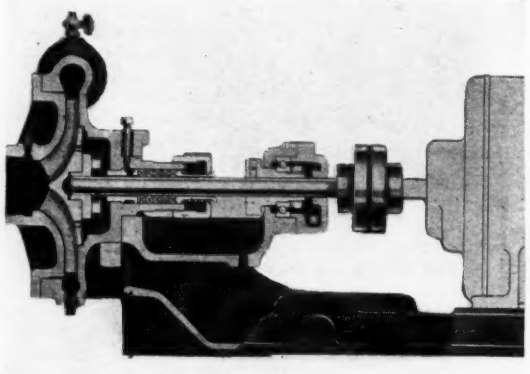
Around 150 different pumping combinations are provided by the line of "Flexi-Unit" pump available in eleven sizes, four styles and four constructions. A special design of bedplate allows mounting and alignment of both pump and motor without the use of shims or blocks. The propeller is of the open, non-clogging type, hydraulically balanced. The inner bearing and seal ring have outside connection for clear water or lubricant, and an unusually deep stuffing box is provided with a spring-loaded gland follower. A deep-groove heavy-duty ball bearing takes the combined thrust and radial load. Capacities up to 1,100 gallons per minute at 350-ft. head are available.

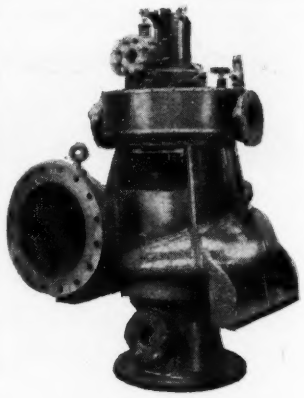
Goulds Pumps, Inc., Seneca Falls, N. Y. June 2, page 896.

High-Speed Spiral Pumps

Designed especially for handling large volumes of water at low head and for stand-by service, this vertical spiral pump will operate at high speeds, giving a small unit over-all for a given capacity and permitting the use of a high-speed drive with its attendant lower cost. The pump, although designed primarily for steam turbine drive, is readily adaptable to motor drive.

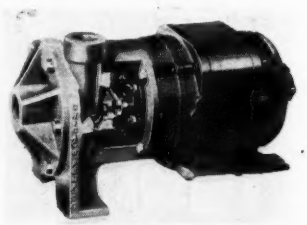
Warren Steam Pump Company, Inc., Warren, Mass. July 21, page 104.





Close-Coupled Centrifugal Pumps

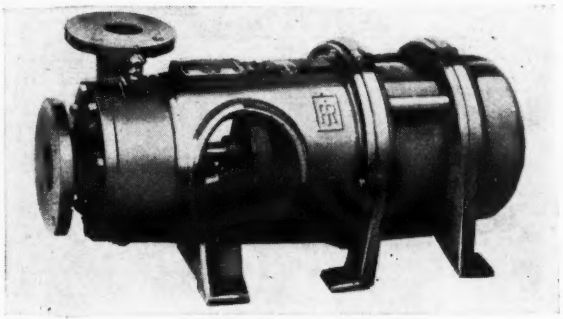
A feature of Type N centrifugal pump is the three-point suspension. The pump casing is semi-steel, the shaft stainless steel and the impeller bronze. Suitable for hot- and cold-water circulation, brine circulation, pressure boosting and various other industrial services, the pumps are available without a water seal for use where there is a positive pressure on the suction, with an inside-connected water seal where there is a vacuum on the stuffing box, and with an outside-connected water seal for use where the liquid being handled is gritty. Capacities range from 3 to 60 gal. per minute.



Chicago Pump Company, 2336 Wolfram St., Chicago, Ill. May 5, page 719.

General-Service Centrifugal Pump

Suitable for such applications as circulating and cooling systems, standpipe and water-supply systems, industrial plants and general service, the Class R.V. Cameron pump is made in six sizes and can be furnished mounted on a structural steel



bedplate to facilitate installation. Pump and motor are assembled as a single unit with a common shaft, producing a compact, light-weight unit. The impeller is made of bronze and is hydraulically balanced. Renewable bronze wearing rings and shaft sleeve are provided. Sizes range from one-inch up.

Ingersoll-Rand Company, 11 Broadway, New York City. June 30, page 1045 and Jan. 19, 1932, page 113.

Unit-Type Pumping Unit

Monobloc Type D centrifugal pump is designed for a wide range of service and can be used as a built-in part of assembled equipments, such as air-conditioning apparatus, filters and filter systems, core-sucking units and others. It can also

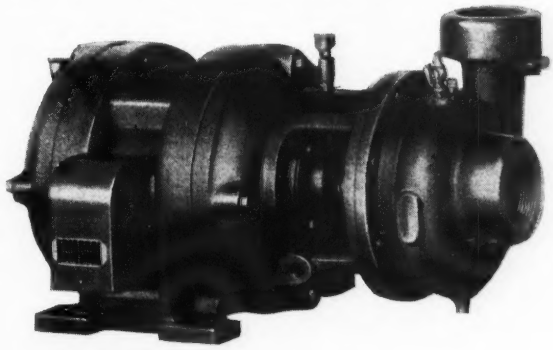
be used for general house service, ice water and brine circulation, booster service for sprinkler systems, and for general industrial service. The pump is bolted to the extended motor frame and the impeller is mounted on the end of the continuous motor shaft. Capacities range from 10 to 150 g.p.m. in heads up to 80 feet.

Worthington Pump & Machinery Corporation, Harrison, N. J. Sept. 8, page 371.

Pump With Totally Inclosed Motor

Adoption of total inclosure of motor housings on the pump end of these units, and totally inclosed fan-cooled motors, permits their use for severe service conditions. Made in a number of sizes and ratings from 30 to 500 g.p.m. and heads up to 100 ft., the Type "SSU" pumps are adapted to such service as water supply; circulation of water, oil or brine for heating or cooling systems; transfer of liquids; air conditioning; house service and auxiliary service to power equipment for cooling water seals, etc.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Feb. 3, page 202.

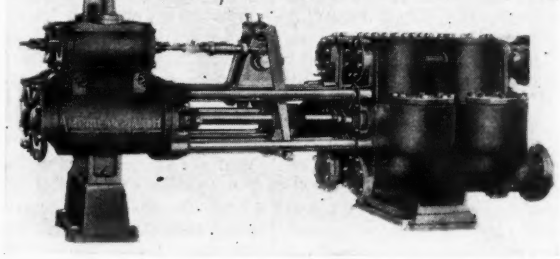


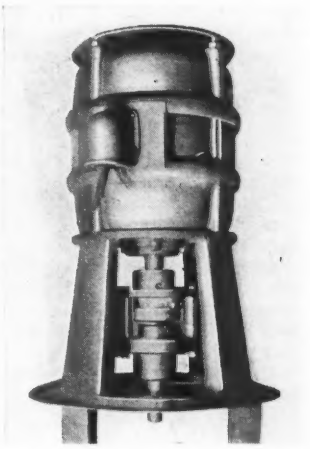
Simplex and Duplex Steam Pumps

Specially suited to high-pressure boiler feeding, this line of steam pumps includes duplex-piston pumps of the side-pot, cargo, turret-top and valve-plate types, also simplex piston pumps of the side-pot, close-clearance type.

The steam end on both the side-pot and cargo pump has balanced piston-valve and is designed for a maximum pressure of 300 lb. The two steam cylinders are separate castings and interchangeable for the right- and left-hand sides of the pump, each cylinder having its steam chest cast integral. Each pot is equipped with a number of small valves or with one large double valve as desired. The steam and fluid ends of the pumps are connected by eight tie bars, a set of four on each side of the pump. Various types of fluid-end valves and piston packing are available, as best suits the service for which the pump is to be used.

American Steam Pump Company, Battle Creek, Mich. Aug. 18, page 251.





Vertical Pump Coupling

With this coupling any standard solid-shaft vertical motor, including slip-ring, direct-current and synchronous motors, may be used, as the coupling contains means of adjusting the position of the pump shaft as required.

The coupling is made in two types—one with backspin release and one without this feature. The coupling without the backspin release provides for thrust in both up and down directions. The coupling with backspin release prevents backspin from unscrewing the shaft sections.

Ideal Electric & Manufacturing Company, Mansfield, Ohio. Sept. 15, page 407.

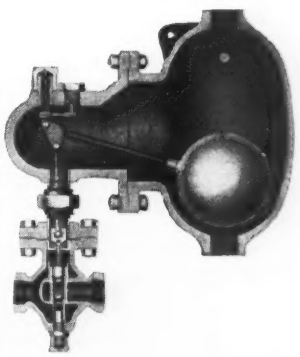
Regulators and Controllers

Feed-water regulators designed to regulate water input by combination of steam flow and water level, hydraulic boiler control, liquid-level, pressure and temperature controllers

Liquid-Level Controller

The design of the float-operated balanced-piston valve used in this liquid-level controller embodies such features as adjustable capacity, graduated valve travel, variable mechanical advantage for the float, adjustable liquid level, adjustable connection between float and valve bodies and interchangeability of service.

The stationary valve cage has two opposing ports, each uniformly 90 deg. wide, and the valve piston is similar in construction. For maximum capacity the ports of one register exactly with the ports of the other. If the pressure differential across the valve should be greater than anticipated, or the



required flow less, the piston may be rotated from the outside while the controller is in service. As the float lifts the valve from the closed position, the

ratio of valve travel to float movement is small, but increases rapidly as the valve opens farther.

Changing the controller from drainage to filling is accomplished by interchanging the fulcrum-adjusting screw and the guide-pin plug. Valve and float bodies are of cast iron for pressures up to 250 lb. and of cast steel for higher pressures and temperatures. Working parts of stainless steel are adapted to any water service, hot or cold, oil, and various chemicals.

Mercon Regulator Company, 1 La Salle St., Chicago, Ill. May 19, page 792.

Series-Type Feed-Water Regulator

Copes series-type regulator, designed primarily for boilers operating with rapidly fluctuating loads, is actuated by two thermostats connected in series. The upper thermostat is influenced by the rate of steam flow, the lower by changes in boiler water level. The steam-flow thermostat is connected to the main steam header, while the lower, or water connection, is made to a reservoir connected to the steam header at the level of the upper end of the thermostat, and on the low-pressure side of the steam connection. If the water level in the boiler drum does not change, the entire valve movement is under the sole influence of the steam-flow thermostat. There is also an adjustment in the compensating connection of the level thermostat.

Provision is made in the design for controlling the ratio of inflow to outflow. This ratio may be such that a high water level is carried at high loads and a low level at low loads, or at any stage between this and the exact reverse of low level at high loads and high level at low loads.

Northern Equipment Company, Erie, Pa. Jan. 19, 1932, page 113.

Water-Level Control for Low-Pressure Boilers

Designed for use with low-pressure boilers, this water-level control consists of a closed casing connected to the boiler at points above and below normal water level. In the casing two valves, one an inlet connected with the source of water under pressure, and the other an outlet valve to the boiler, are operated by a single float. Both valves are submerged in the water in the casing. Counterweights are provided to close the inlet valve.

Sterling Engineering & Manufacturing Corporation, 119 Business St., Hyde Park, Mass. Aug. 18, page 250.

Three-Element Feed-Water Control

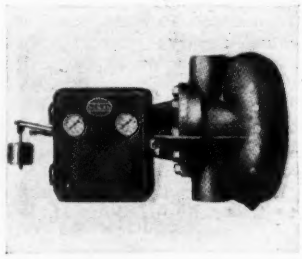
The three elements from which this control is operated are steam flow from the boiler, feed-water flow to the boiler and water level in the boiler drum. To nullify the effect of "swell" and to maintain the rate of feed-water input more nearly equal to the rate of steam output, this control functions primarily from steam flow, but is modified slightly by water level when necessary.

The control is based on metered results. The three elements of steam flow, feed-water flow and boiler-water level are co-ordinated by means of linkage to operate a selsyn sending device through a torque amplifier.

The selsyn method of electrical transmission is used as the connection between the flow meters, which are the primary source of control, and the feed-water regulating valve. This valve is provided with its own motor-driven oil-pumping unit mounted directly on the bonnet, giving a self-contained unit and eliminating the necessity of extensive oil piping.

A hand control is incorporated which permits operation of the control valve independently of the automatic control. This involves the operation of a switch only, after which the valve may be positioned manually.

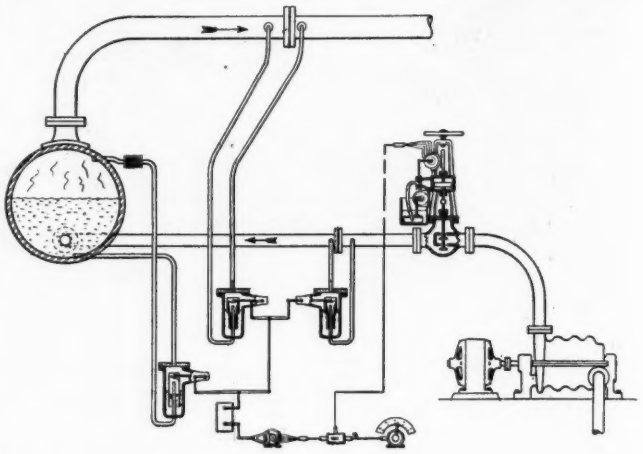
Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. Dec. 15, page 876.



Instrument-Type Liquid-Level Controller

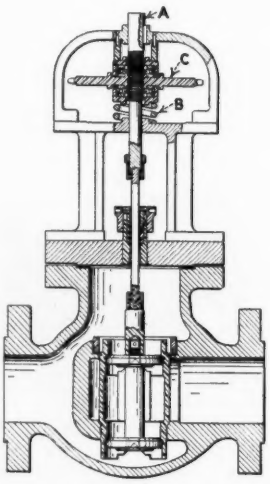
In this instrument-type liquid-level controller, designed especially for use with liquids of high gravities, only a 6-in. float is required to provide ample power for maintaining levels in liquids of even the highest gravities. The instrument is of the pilot-operated type and may be used to operate a remotely located control valve. It is also applicable for interface service where the float is required to sink in one liquid and float in another of a different specific gravity.

Neilan Company, Ltd. (Division of Mason Regulator Company), 641 Santa Fe Ave., Los Angeles, Calif. Jan. 12, 1932, page 77.



Automatic Control Valve

The design of Type K control valve is such that it can be placed in a vertical or horizontal pipe. It is fully balanced and fitted with V-ports designed to give a straightline flow characteristic. The valve cage is of one-piece construction, but provision is made in the method of fastening it in the valve body



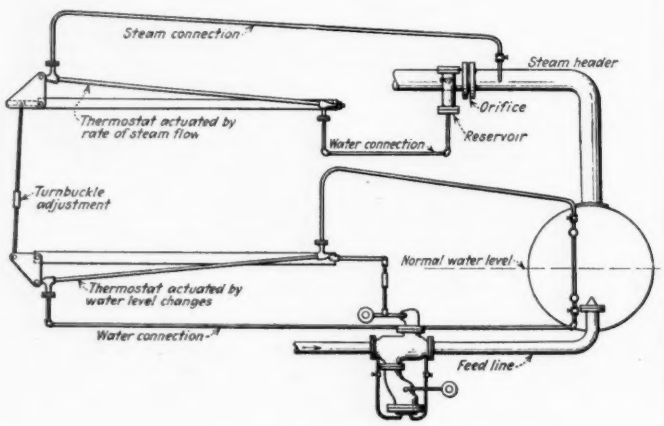
to take care of difference in expansion and contraction.

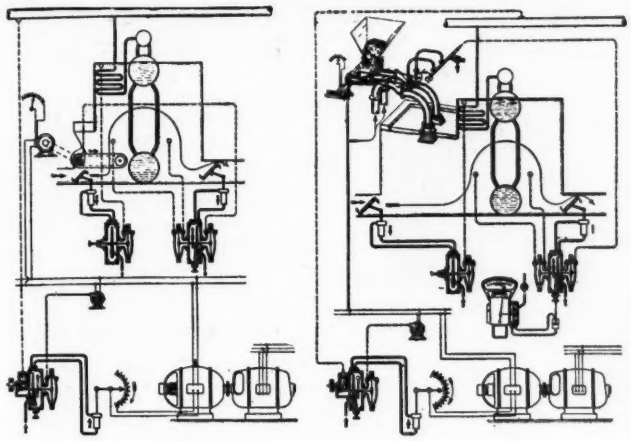
The valve is opened by pressure applied to the stem by a hydraulically operated sylphon unit (not shown) and closed by a spring. Tension on the spring is regulated by a handwheel fitted with a ball bearing on each side.

Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. June 23, page 1009.

Hydraulic-Jet-Type Boiler Control

In its simplest form this control system consists of a pump supplying oil under pressure to a jet pipe arranged to oscillate on a hollow pivot through





which it receives the oil supply. Linked to a corrugated-metal diaphragm counterbalanced by a weight on one side and to an adjustable spring on the other side, the jet pipe moves according to the variation in pressure of the medium under control. It may be applied to hand-, stoker- and pulverized-fuel-fired boilers. When applied to boilers fired by chain grates, air from a small fan on the stoker driveshaft is used instead of oil, thus tying together the coal feed and the air supply. To obtain fine adjustment of stoker speed through a wide range, preferably all drive motors, shunt-wound direct-current units, are connected in parallel with the generator of a motor-generator set designed for voltage regulation on the Ward-Leonard principle.

The system for use with pulverized-coal firing is a variation of that used in stoker-fired plants. The main load governor influences only the coal quantity by control of the feeder motors, while the air quantity is governed indirectly by the revolutions of the screw feeders.

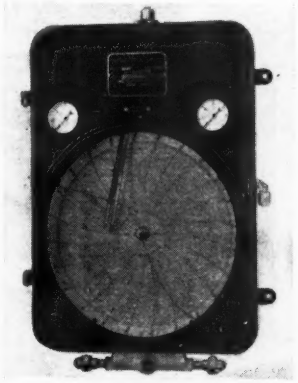
An innovation in this system is the direct use of the CO_2 recorder to correct air excess automatically.

H. A. Brassert & Company, 310 South Michigan Ave., Chicago, Ill. June 9, page 932.

Air-Operated Recorder Controller

In the Bristol air-operated recording controller a "Free Vane" is attached to and actuated by a measuring element of a temperature or pressure recording system and moves between two air jets with streamlines coinciding placed opposite each other. In passing into these air streams the "Free Vane" varies the amount of air which escapes from the jets, thus effecting control.

Air at 15 lb. pressure is admitted through a filter, one branch leading to an indicating gage and the other branch to the control system. This supply branch in turn divides into two branches, one passing through an orifice supplying the elastic element and then through a connecting line to the opposing jets. The other branch supplies air to a pilot valve and through the pilot valve to an indicating gage and outward to the diaphragm motor valve. The changing amount of dissipated air at the jets produces a pressure change on the elastic element and a consequent deformation which operates a



pilot valve, admitting more or less air to the diaphragm.

The controller is furnished as a single- or two-pen instrument in combination of pressure or temperature and has a pressure range up to 1,500 lb. and temperature range up to 1,000 deg. F. using 12-in. charts. Temperature-measuring systems may be either vapor- or gas-filled, depending on the operating temperatures encountered.

Bristol Company, Waterbury, Conn. Oct. 27, page 618.

Proportioning Motor Control System

No mechanical interconnection is required between the power unit of this proportioning motor control system and the electrical balancing mechanism. The transmission system operates on the Wheatstone Bridge principle.

The power unit, inherently a motor-driven speed reducer, causes its drive shaft to take a new position whenever the conditions under control (such as temperature) change slightly. If a device such as a valve, louver or rheostat is driven by the motor, then its operation tends to correct the change, and

equilibrium is approached. The apparatus may be used in conjunction with practically all types of control instruments, and in the control of such services as temperature, pressure, humidity, liquid level, rates of flow, stoker or pulverizer feed.

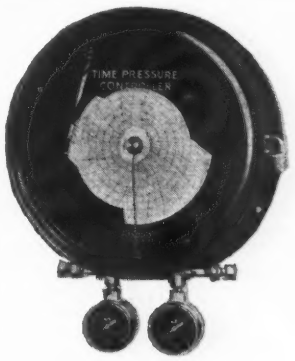
Minneapolis-Honeywell Regulator Company, 2707 Fourth Ave. South, Minneapolis, Minn. Sept. 29, page 477.

Non-Recording Pressure Control Instrument

Made to control pressures in ranges from 0 to 5,000 lb., this controller has been greatly simplified in design over previous

models and embodies a compound pilot valve and sliding wedge actuating block which enables any degree of sensitivity to be obtained at any point on the pressure range. The case and other parts are made of duralumin, with certain internal working parts of stainless steel.

Neilan Company, Ltd. (Division of Mason Regulator Company), 641 Santa Fe Ave., Los Angeles, Calif. Nov. 10, page 689.



Non-Recording Time Controller

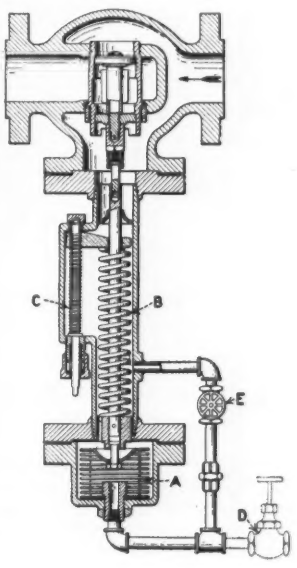
This controller is designed to maintain a predetermined cycle of operation in any process involving temperature or pressure. It is similar in appearance and construction to the standard Foxboro recorder-controller except that the non-recorder has a printed aluminum cam instead of a paper chart and a specially designed cam follower in place of the penarm. This construction has made it possible to obtain a 1-to-1 ratio between the cam reading and control point setting.

In regulating gas pressure, for instance, the controller is used in conjunction with a diaphragm motor-controlled valve, to build up or let down the pressure in the line according to previously determined load conditions.

Foxboro Company, Foxboro, Mass. Oct. 20, page 582.

Governor for Turbine-Driven Feed Pumps

Designed for use with turbine-driven feed pumps, the improved Style R feed pump governor employs a high-pressure sylphon instead of a piston as



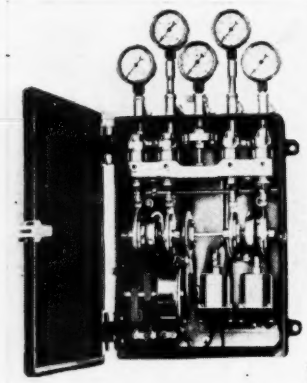
formerly used to operate the valve. Feed-water pressure is transmitted to the inside of the sylphon, this force being balanced by the steam pressure and the spring on the outside.

The governor may be set for any desired differential by adjusting the spring tension. A bypass is also provided. The valve is of tight-seating, fully balanced design, and the entire seating arrangement can be easily installed or removed from the valve body without taking the latter from the line.

Bailey Meter Company, 1036 Ivanhoe Road, Cleveland, Ohio. April 21, page 643.

Pneumatic Cycle Controllers

For application where greater flexibility is required than is provided by the single-cam type of instrument, and where the different events in the cycle overlap by varying degrees, the pneumatic cycle controller has been made available. Here several individual cams are



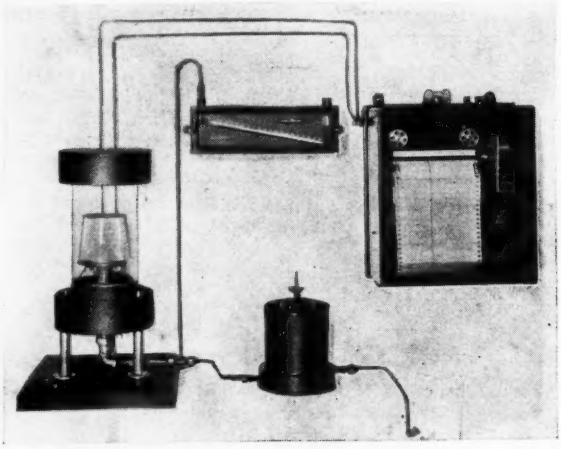
mounted on a common shaft, and each is adjustable through a wide range, both as regards the duration of its influence in the cycle and its position in the sequence of events. The pneumatic features of this instrument are identical with those of the single-cam controller.

The instrument does not perform the function of regulation; but may be used in conjunction with pneumatic or electrical regulating devices for pressure, temperature, etc.; and, with suitable accessory equipment, it lends itself to those types of control where a certain degree of interlocking is required.

Bristol Company, Waterbury, Conn. Aug. 4, page 178.

Control for Heating Effect of Gases

Especially designed to check the heating effect of fuel gas, this flame analyzer can be supplied to measure, record and automatically control the heating effect of any gas. With this instrument industrial plants using producer gas, and plants supplying butane gas, are enabled to check and regulate the quality of their gas output with special reference to heating effect.

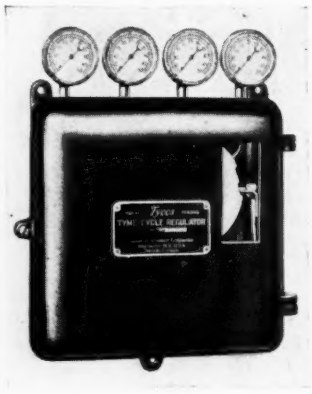


In certain industrial processes where uniform heating effectiveness of a gas fuel is vital, or where the rate of heat propagation must be maintained at a constant value, the automatic control type of flame analyzer will maintain a uniform pilot flame in the analyzer, which, in turn, will result in unvarying flames throughout the plant.

Brown Instrument Company, 4496 Wayne Ave., Philadelphia, Pa. March 24, page 495.

Time-Cycle Regulator

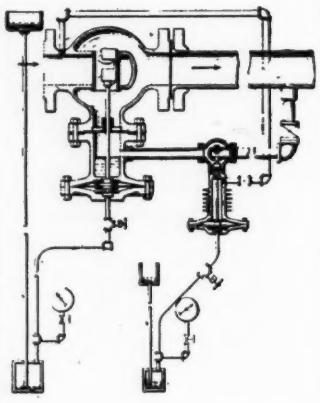
Where various mechanical functions are actuated by pneumatically or hydraulically operated pistons, diaphragm valves or electro-pneumatic switches, this "Tyme-Cycle" regulator will automatically control such operations according to a predetermined time schedule. The motive power for the instrument is 25-lb. pressure compressed air. It consists of an electrically driven cam which, as it revolves, progressively opens or closes small pilot valves. The latter, in turn, regulate the supply of compressed air to diaphragm valves, electro-pneumatic switches or other pneumatically operated devices.



Taylor Instrument Companies, Rochester, N. Y. March 24, page 493.

Pilot-Valve-Controlled Reducing Valve

Preventing an excessive demand for process steam lowering the initial or supply pressure below a fixed minimum is the



function of this pilot-valve-controlled reducing valve.

The system permits only steam in excess of 125 lb. pressure passing to the low-pressure system. A ½-in. or ¾-in. connection transmits the reduced pressure of 25 lb. through a pilot valve to the upper surface of a regulator diaphragm. The diaphragm is balanced by a mercury column of sufficient height to exert a pressure of 25 lb. on the lower surface. The regulator consequently operates in the usual way and maintains 25 lb. reduced pressure so long as the supply or boiler pressure is above 125 pounds.

Normally the pilot diaphragm is held down by pressure transmitted through a small pipe from the boiler or inlet side of the regulator, this pressure being sealed in by the valve plug seating on the lower seat ring.

Other applications of this device are for two-pressure boiler plants where the excess of high-pressure steam may be used in the low-pressure system but it is desired to prevent the demands of the latter lowering unduly the higher pressure.

Mercon Regulator Company, 1 La Salle St., Chicago, Ill. April 14, page 602.

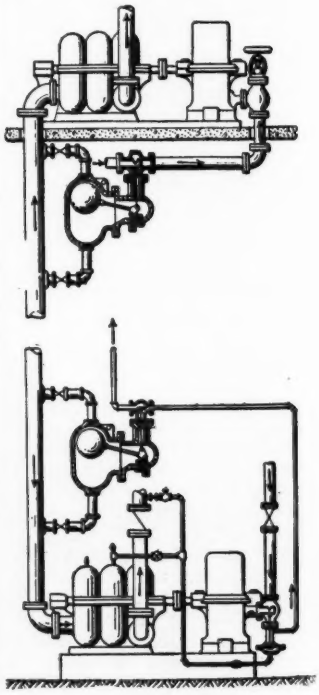
"No-Water" Stop for Centrifugal Pump

The function of this "No-Water" stop is to obviate the possibility of a centrifugal pump's being operated with the suction valve closed or after the suction has failed. In the case of a motor-driven pump, the "stop" operates a small switch in the control circuit of the motor starter.

Depending upon the direction taken by the suction line, the float may be placed above or below floor level. When the suction line is full of water, the float chamber also is full of water, and the float holds the steam valve wide open. Should the water recede in the suction the float drops and closes the steam valve.

Designs also have been made to use the "No-Water" stop in combination with the standard Mercon excess-pressure pump regulator. Instead of being directly in the steam line to the turbine, the float-operated valve is placed in a ½-in. vent line from the steam side of the diaphragm.

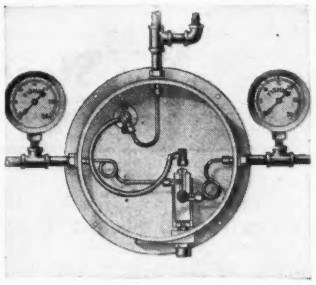
Mercon Regulator Company, 1 La Salle St., Chicago, Ill. Nov. 3, page 654.



Differential Limit Controller

To cut in automatically additional make-up in industrial process plants when the differential falls below a set point and cut it out again when the differential rises to the normal value is a function of this pressure-limit controller. It can also be used for cutting in and out additional meters in measuring systems at times of varying load conditions, for controlling compressor units, starting and stopping booster pumps, opening and closing valves, etc. The instrument is simple in design and is entirely self-contained.

Neilan Company, Ltd. (Division of Mason Regulator Company), 641 Santa Fe Ave., Los Angeles, Calif. Sept. 22, page 441.



Pilot Controller

Type 4,000 pilot controller uses neither diaphragms nor springs, the change of the leak of the operating medium (air or gas) being accomplished by the varying position of a Bourdon tube.

Flexibility in construction allows a change from direct action pressure-control valve to a back-pressure valve, or vice-versa. A wide pressure range is effected by a change of Bourdon tube. Any unit can be adjusted for low-pressure control or any pressure range up to 2,500 lb. by using a suitable tube. The control is especially adapted to reduced pressure, back pressure, boiler gas fuel and vacuum control. A modification can be furnished for control of differential pressure.

Fisher Governor Company, 1404 Fisher Bldg., Marshalltown, Iowa. Aug. 18, page 250.

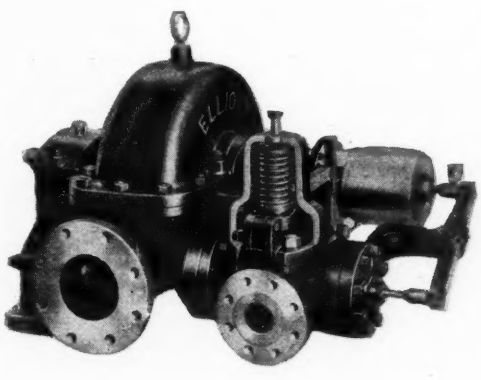
Steam, Oil and Gas Prime Movers and Auxiliaries

Mechanical-Drive Turbine

Type AY mechanical-drive turbine is made in a range of sizes from 5 to 60 hp. It is a single-stage unit, the rotor having either two or three bucket wheels, depending upon conditions. When built with cast-steel casing and steam chest, the unit is suitable for operation with 400-lb. steam and 700-deg. temperature.

The design incorporates horizontally split casing, steam and exhaust connections in lower half of casing, a three-weight governor, emergency overspeed governor separate from speed governor, each governor actuating its own valve, and supports providing for the axial and lateral expansion.

Elliott Company, Jeannette, Pa. May 12, page 754.

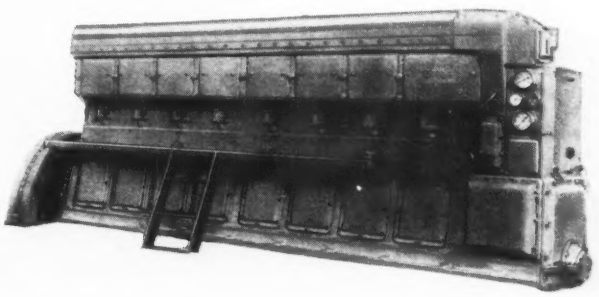


Stationary-Type Diesel Engine

Spray valves and driving levers are directly beneath the camshaft in place of on the cylinder head in the Type JT diesel engine. This allows the engine head to be removed without touching the spray valve and injection setting.

Made in cylinder numbers of three, four, six or eight, the horsepower ratings are from 150 to 480 when operating within the speed range of 300-360 r.p.m. The cylinders have 11½-in. bore and a 15-in. stroke. Power cylinders are liners of nickel iron, and gray-iron pistons are used. For high-speed work either alloy pistons or combination iron skirt and alloy head pistons are furnished. Cylinder heads carry single-intake, exhaust, air-starting and relief valves, all seated in removable cages.

Cooper-Bessemer Corporation, Mount Vernon, Ohio. Sept. 8, page 370.



Two-Stroke-Cycle Air Injection Diesel

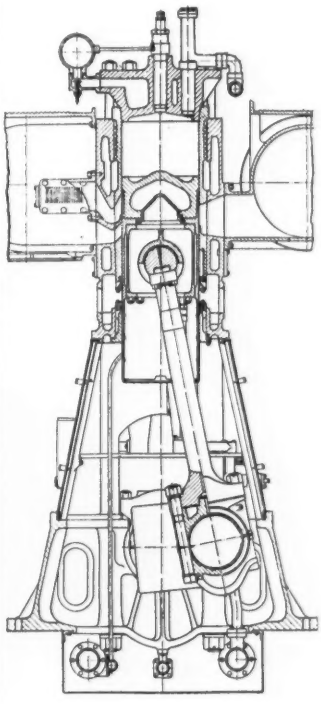
In this 3,000 hp., 10-cylinder, two-stroke-cycle engine each cylinder is 19½ in. bore x 27-in. stroke and delivers 330 hp., of which 33 hp. is consumed per cylinder in operating the motor-driven scavenging blower. Scavenging is through two sets of ports, with the upper tier provided with light strip-type automatic air valves.

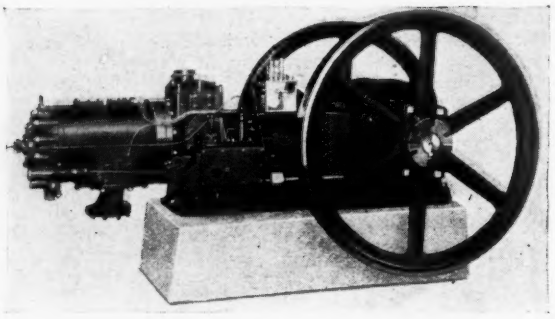
The crown of the piston is a steel casting provided with an internal air-cooling cavity and held to the skirt by studs. The piston pin is attached to the flange end of the connecting rod and rests in an internal housing. The lubricating oil that passes up through telescopic tubes to cool the piston crown does not enter the crankcase sump, but passes through piping to the outside oil sump and is circulated by an individual pump.

The fuel injection system and combustion chamber shape are of the A.E.G.-Hesselman type. There is a separate fuel pump for each cylinder, all pumps being combined in a common housing, with a single drive. The fuel lead is constant for all loads; the quantity is regulated by the governor control of the point of opening of the spill valve. The arrangement is such that the engine may be made directly reversible by the addition of astern cams and a few simple parts, the starting, stopping, reversing and fuel-control being performed by means of a single handwheel.

The scavenging air ports are shaped to direct the air in spiral currents, so that as the piston approaches the cylinder head the entire air mass has a circular flow of a definite velocity. The spray valve is provided with several orifices to inject the five streams of oil into the moving air mass.

Busch-Sulzer Brothers Diesel Engine Company, St. Louis Mo. April 21, page 626.





Two-Cycle Convertible Diesel

With a rating of 40 hp. at D.C. engine follows closely that d.c. engine follows closely that of the Reid Type C gas engine. It is a solid-injection, two-stroke-cycle diesel having no mechanically operated valves. Two cylinder heads are used and the change from oil to gas fuel is readily made by exchanging the heads. This can be done by two men in approximately one hour.

Maximum power ratings of the engine at 275 r.p.m. are given as, gas, 48 hp. and oil, 51 hp. The bore is 10¾ and the stroke 14 in. Maximum economy when producing 44 hp. at 275 r.p.m. is given as, gas, 11½ cu.ft. and oil, 0.4 lb. per brake horsepower-hour.

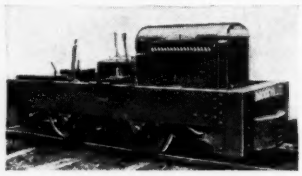
Joseph Reid Gas Engine Company, Oil City, Pa. July 21, page 105.

Industrial Locomotive With Five-Speed Transmission

Powered by a Model "300" McCormick-Deering industrial unit and equipped with a five-speed transmission and with an inclosed gear reverse that makes all five speeds available in either direction, this industrial locomotive has speeds from 2 to 16 mi. an hour and the transmission gears can be shifted while the load is in motion.

Gages from 22 to 56½ in. or wider are available and units can be furnished equipped with either four pocket link-and-pin couplers or with MCB couplers for use with standard cars.

Brookville Locomotive Company, Brookville, Pa. March 17, page 458.

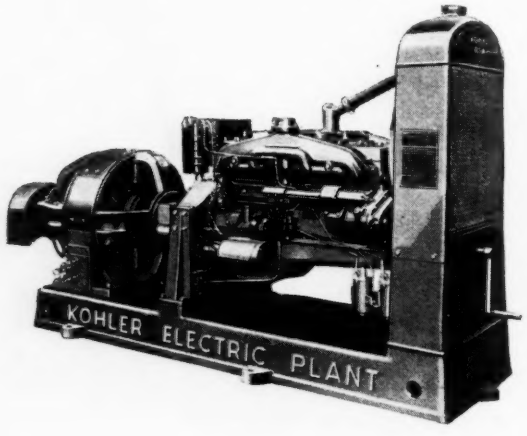


Portable Automatic Power and Light Units

Six-cylinder heavy-duty industrial engines of the L-head type with removable cylinder heads are used in the Kohler automatic power and light units of 20-kw. direct-current, and 25-kva. alternating-current capacity, suitable for emergency installation and power and light in small communities where centralized current can be used.

An extra-heavy crankshaft is supported by seven main bearings, and full pressure oiling is used to all engine bearings. Cooling is by means of a large-sized radiator and water-circulation pump. The starting system, 12 volts, is controlled by a special relay system. Standard 110- or 220-volt generators, both alternating-current and direct-current, can be furnished.

Kohler Company, Kohler, Wis. Jan. 12, 1932, page 75.

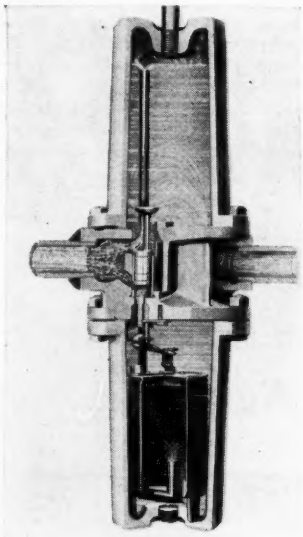


Steam Traps

Compound Steam Trap

Simple in design, with few moving parts and a high capacity for a given diameter of discharge orifice, this compound piston-operated trap consists of two standard Armstrong trap bodies bolted to a piston housing. This construction makes the entire trap mechanism readily accessible.

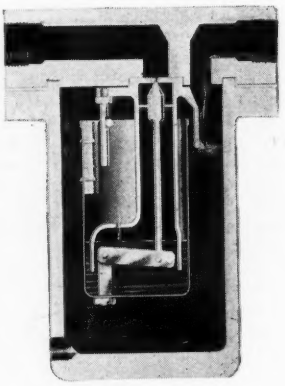
In the No. 230 series, for pressures up to 250 lb., the piston housing and bodies are made of semi-steel containing nickel and chromium. For high-pressure and -temperature service the bodies are one-piece forgings, and the piston housing is machined from a solid steel billet. The valves are of a special alloy steel. The new trap is made in standard pipe line sizes from 1 to 3 inches.



Armstrong Machine Works, 812 Maple St., Three Rivers, Mich. May 19, page 793.

Forged-Steel Trap for High Pressures

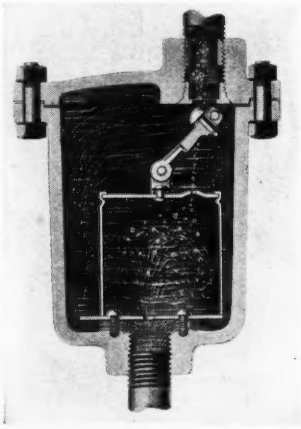
Operating principle identical with that used in the "Airxpel" trap for pressures up to 250 lb. is used in this trap designed for pressures up to 700. The body and cover of the new trap are of forged steel, and valve and seat are of nitralloy, heat-treated and nitrided. The bucket is of chrome-plated copper, and the working parts are of chrome and stainless steel. Like the previous model, it can be hung on the pipe line without other support, has straightway horizontal connections, and the working parts are readily accessible without disconnecting the trap from the pipe line.



Wright-Austin Company, 409 Griswold St., Detroit, Mich. March 10, 1931, page 418.

Trap With Self-Venting Inverted Bucket

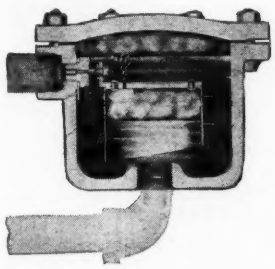
A float mounted directly on a lever, thus eliminating compound levers and valve stems and the use of a deflector at the inlet characterizes this Model A inverted-bucket, self-venting steam trap. The deflector plate, in addition to forming a rest for the inverted float, has an orifice in the center which prevents an excess of inflowing condensate from impinging upon the bottom of the bucket, causing it to rise and partly close the valve.



Valve and seat are of nitralloy, and all the mechanism, including the lever and pins, is made of heat-treated, rust-resisting alloy. The trap is comparatively light in weight

and can be carried by the connecting pipe lines without the use of other support. It is made in ½- to 2-in. pipe sizes and to operate at all pressures from vacuum at 300 pounds.

V. D. Anderson Company, 1935 West 96th St., Cleveland, Ohio. May 5, page 718.



Inverted Open-Float Steam Trap

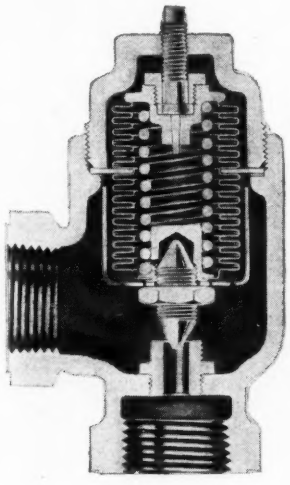
Made in ½- and ¾-in. sizes for pressures up to 150 lb., this open-float trap is intended for use with steam-heated units such as heating coils, unit heaters, steam mains and risers, and it may be used on both low-pressure and vacuum systems.

The float is drawn in one piece and has a needle-point valve mounted on the top as shown. With the inlet connected at the bottom center of the body the discharge can be turned to any desired angle. The trap is light in weight and may be supported by the connecting pipe lines. Capacities in pounds of condensation per hour for the ½- and ¾-in. sizes are, at 5 lb. pressure, 404 and 1,640, and for 150 lb. pressure 330 and 1,435 lb. respectively.

Crane Company, 836 South Michigan Ave., Chicago, Ill. Jan. 26, page 146.

Thermostatic Trap

When the adjusting screw of this trap is all the way up there is no tension on the spring and the trap will discharge the condensate from 1 to 2 deg. below the temperature of the operating steam. When tension is applied to the spring a mechanical pressure is created on the inside of the bellows to close the valve. Thus the adjustment of the screw determines whether the trap will close at the temperature of the operating steam or at 15 to 25 deg. below this temperature. The trap is fitted with reversible and renewable seats and disks. It is made in 1-in. size only.

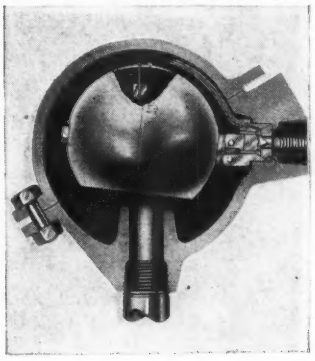


C. J. Tagliabue Manufacturing Company, Park and Nostrand Aves., Brooklyn, N. Y. Sept. 1, page 339.

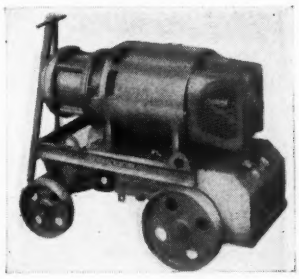
Trap With Spherical Body and Float

The piping connections to this inverted-bucket trap are made at right angles so that the cover can be removed from the spherical body without disturbing any piping. The vent hole in the bucket, which is common to all inverted bucket traps, is equipped with a weighted wire cleaner. The wire cramps in the hole at each movement of the bucket, preventing the formation of any stoppage. The valve seat is held in place by a two-stud type of gland, the bearing on which also supports the float and the bore of which serves as a valve guide. The trap is available in all sizes from ½ to 2 in. and for pressures up to 250 pounds.

A. W. Holbrook & Sons, Inc., Palmer, Mass. July 21, page 104.



Welding Machines and Accessories



Single-Operator Welding Set

WD-20 line of single-operator welding sets includes both portable and stationary units. Types include those for operation on either alternating or direct current at all standard voltages.

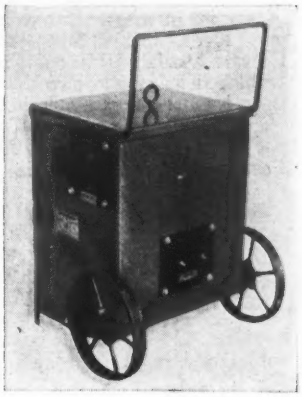
Among the principal advantages claimed for the line are the use of two-bearing construction on the alternating-current types up to 600 amp.; compactness and lightweight; and greatly improved welding characteristics. The sets are self-excited, with a tapped series field for major current adjustments and a shunt field rheostat giving duplex voltage control.

General Electric Company, Schenectady, N. Y. Oct. 13, page 546.

Arc Welder With Single Adjustment

All current adjustments are made by a simple "electrode indicator" on this full-range arc welder, which is set by the operator for the size of electrode being used. A high striking voltage of 60 volts is provided and is constant for all commercial sizes of electrodes, either bare or coated. The generator is designed to produce an arc which prevents burning on light work and assures deep penetration on heavy work.

USL Battery Corporation, Niagara Falls, N. Y. July 14, page 67.

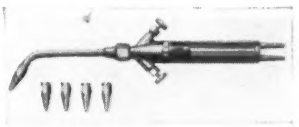


Alternating-Current Arc-Welding Set

With this alternating-current arc-welding set, which is particularly suited to the welding of thin gage material either bare or coated electrodes from $\frac{1}{32}$ in. to $\frac{1}{8}$ in. in diameter may be used. Also, many of the ferrous alloy materials commonly used with reversed polarity direct current are effectively and easily applied in conjunction with this welder.

The entire equipment, consisting of a special self-cooled transformer, short-wave arc-control system and current-regulating unit, is mounted in a welded steel case.

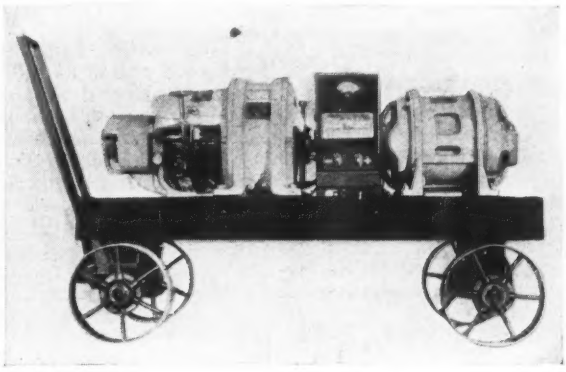
Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa. Sept. 22, page 441.



Welding Blowpipe for Light Work

Suitable for light welding work of all kinds, type W107 torch operates on the medium-pressure principle.

The gases mix immediately in front of the handle, and the oxygen and acetylene valves are so located that they can be readily adjusted with the thumb and forefinger of the hand that holds the torch. The blowpipe

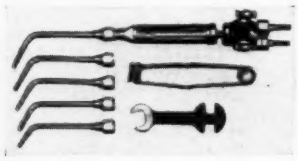


is 10½ in. in length and weighs only 10 oz. Six different-sized tips are available, although it is furnished as standard with five tips, Nos. 2 to 6, inclusive.

Linde Air Products Company, 30 East 42d Street, New York City. March 17, page 457.

Blowpipes With Detachable Valve Body

On types W105 and W106 welding blowpipes a detachable valve body enables the operator



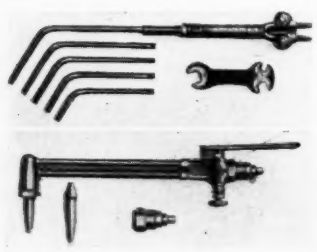
to change from the standard to different handles quickly.

Both blowpipes are designed for use with the new-type one-piece, hard-drawn copper welding tips. Although regularly supplied with a head angle of 60 deg., this may be changed by the user to any angle desired. Ten different sizes of tips, Nos. 4 to 13, inclusive, are available for use with the Type W105 handle. A stem adaptor is available, so that tips for the Type W107 welding blowpipe may be used with Type W105. This makes the new blowpipe adaptable for work ranging from the lightest sheet metal welding to heavy welding work.

Linde Air Products Company. June 2, page 897.

Welding Torch and Cutting Attachment

Purox No. 11 welding torch, which supersedes No. 10, has a wide welding range extending from the lightest sheet metal up to work as heavy as ½-in. plate. The tips are of one-piece, hard-drawn copper construction and are so designed that the head angle can be readily adjusted. Tips No. 2, 4, 6, 8 and 10 are



furnished as standard equipment.

The Purox No. 21 cutting attachment will cut metal up to 2 in. in thickness. It is furnished with one- and two-piece cutting tips.

Linde Air Products Company. Oct. 13, page 546.

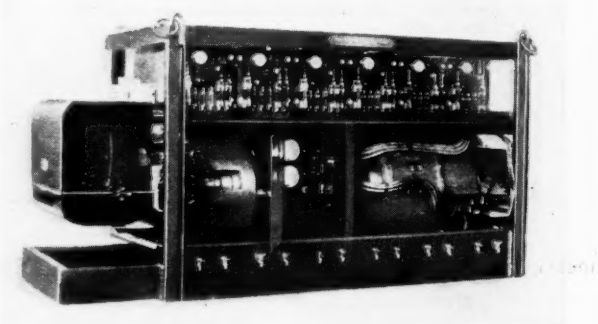
Electrode for Arc-Welding Stainless Steel

For the arc-welding of stainless steel Stainweld A extruded electrode is used with usual polarity of welding current reversed. The coating of the electrode contains no carbon, which eliminates the possibility of the molten weld metal absorbing carbon from the electrode coating during the welding process. Welds are produced in a shielded arc, which prevents the combination of atmospheric oxygen and nitrogen with the molten weld metal from forming oxides and nitrides in the weld.

Lincoln Electric Company, 13034 Colt Road, Cleveland, Ohio. April 28, page 679.

Constant-Potential Multiple-Arc Welder

This constant-potential, multiple-arc welder has capacities ranging from 400 to 1,500 amp.



(one-hour ratings). All of the machines included in the line are four-bearing, single motor-generator types, and all have close control. Panels are mounted either on the frame of the motor-generator set or separately in any part of the plant.

Wilson Welder & Metals Company, Inc., North Bergen, N. J. July 28, page 141.

Heavy Welding Electrode

This heavily coated electrode, composed of 0.13 to 0.18 carbon steel and covered with a heavy coating of cotton braid impregnated with an arc-stabilizing flux, is available in diameters from ⅛ to ⅜ in. x 18 in. length.

Metal deposits of this electrode have high tensile strength and produce a homogeneous structure resulting in a ductile weld. This is caused by the fact that during the arc-transference period the metal is in a protective atmosphere, because the electrode itself burns away more quickly than the coating and excludes the air.

General Electric Company, Schenectady, N. Y. March 10, page 419.

Manganese Electrode Gives Shielded Arc

Known as "Manganweld," this electrode is said to produce a weld with the structure and qualities of wear-resisting cast manganese steel.

The electrodes are 11 to 15 per cent manganese steel and the weld is "air toughening," which eliminates the necessity of quenching the bead. A heavy extruded coating provides a shielded arc, allowing the transfer of metal to take place under non-oxidizing conditions. Manganese electrodes are available in ⅛-, 5/32-, 3/16-, and ¼-in. sizes of the standard and 14-in. lengths.

Lincoln Electric Company, 13034 Colt Road, Cleveland, Ohio. Sept. 15, page 406.

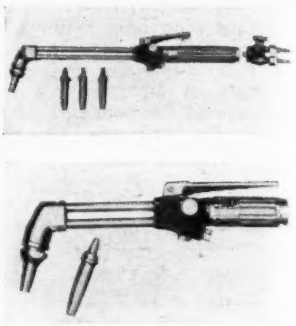
Fluxed Electrodes

This Ductone fluxed electrode permits carrying the rate of fusion as high as it is possible for an operator to handle with the metallic arc. A long arc is employed, and the arc voltage may be double that with a bare steel electrode. Tests indicate that the electrode will produce welds in mild steel possessing tensile strength of over 75,000 lb. per square inch. Ductone fluxing can be applied as a coating to various carbon and alloy steel rods.

Fusion Welding Corporation, 10257 Torrence Ave., Chicago, Ill. April 14, page 603.

Oxy-Acetylene Cutting Apparatus

By means of the detachable valve body, the operator can change easily and quickly from a full-size welding blowpipe to a smaller welding blowpipe, to a full-size cutting blowpipe, or to a cutting attachment without detaching the hose or hose con-



nections and without the use of a wrench. The locking device for connecting the detachable valve body to any one of these blowpipe handles consists of a locking bolt and wedge-shaped locking screw.

The blowpipe is furnished as standard with four cutting nozzles and a 75-deg. angle head. If required, a 90-deg. angle head can be furnished.

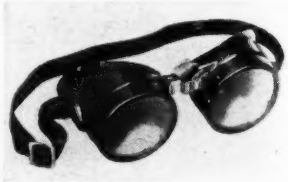
Linde Air Products Company. Sept. 8, page 371.

Welding Goggles

Increased field of vision by the use of 50-mm.-diameter lenses instead of the usual 47-mm. lenses is a feature of Oxweld No. 12 goggles. The eyepieces are joined with an adjustable leather strap so that they may be correctly spaced to the width of the face.

Brown color lenses, known as the "B" type, are available as with older goggles, and in addition a new special-quality green lens, known as the "A" type, is available in three different shades. Lenses may easily be changed by simply removing the metal cups, which unscrew from the frames of the eyepieces.

Linde Air Products Company, 30 East 42d Street, New York City. Aug. 18, page 251.



Electrode for Mild Steel

Known commercially as "Fleetweld," this new electrode for welding within the shielded arc on mild steel insures a higher ductility of weld metal, increased tensile strength and greater resistance to corrosion. It requires high welding current and allows welding speeds 2 to 4 times greater than those secured by bare electrodes.

Lincoln Electric Company, 13034 Colt Road, Cleveland, Ohio. Dec. 1, page 809.

NEWS of the FIELD

New Utility-District Bills Introduced in N. Y. Legislature at Suggestion of Roosevelt

UNDER urge of special message from Governor Franklin D. Roosevelt, Minority Leaders Dunigan and Steingut introduced in the New York State Senate and Assembly Feb. 15 a bill amending the general municipal law, allowing the creation of municipal utility districts, with power to acquire, own and operate public utilities, and a bill amending the public service law so as to enable the Public Service Commission to grant franchises to such municipal utility districts.

Under the terms of the municipal utility district bill, the district would be created by petition, hearing and vote of the people and must with certain exceptions embrace contiguous territory. When created such district would be a body corporate and have the power to issue bonds and obligations to purchase, or acquire and to operate, or lease the right to operate, public utilities specified in the resolution creating such districts. Among other things the bill gives the right to acquire property of a utility corporation as a public necessity.

These bills are similar to measures introduced last year in the Legislature, with certain additions, notable among which is the provision on Section 151 that "whenever a surplus of such services or commodities exists over the amount thereof required by the inhabitants or users within the municipality, such municipality may sell or otherwise dispose of the same outside the municipality to persons, public or private corporations or other municipalities."

Declaring that last year's measures received inadequate consideration, Governor Roosevelt urged passage of the present bills in his special message. In part he said:

"The intermediate report of the Power Authority points out the necessity of early adoption of legislation which will permit municipalities to buy the cheap electrical power to be developed from the St. Lawrence. In connection with this, one or more municipalities should also be enabled by law to combine into a utility district for this purpose. It is equally important that municipalities, acting either for themselves or in conjunction with other municipalities or parts thereof, should have the right, on the approval of a majority of the voters in the region affected, to manufacture, transmit and distribute electrical energy.

"Last year there were introduced in the Legislature two bills to carry out this purpose. They were not passed. Nor indeed, were they given any adequate consideration. I am causing legislation to this end again to be introduced and trust that your Honorable Bodies will adopt it so as to permit municipalities to help reduce rates for electricity for their inhabitants. A number of municipalities in the state now have this right; and it is common knowledge that the rates for electrical energy are much cheaper in those localities than elsewhere."

Supreme Court to Rule on G. O. Smith's Confirmation

THE SENATE fight to cancel its confirmation of George Otis Smith as chairman of the Federal Power Commission came before the United States Supreme Court Feb. 15 in a motion asking a decision on the broad questions involved. The case is pending in the District of Columbia Court of Appeals, and that body has asked the court to pass on one phase.

John W. Davis, counsel for the Senate, was joined by Solicitor General Thatcher in urging the Supreme Court to decide the right of the Senate to withdraw its confirmation of Presidential appointees. The motion also asked that the case be advanced for hearing.

Mr. Smith was confirmed in December, 1930, by the Senate, but it claimed later that the time in which it might change its mind had not elapsed and withdrew its approval. The President, however, insisted that it was too late for the Senate to change its mind, and the District of Columbia Supreme Court upheld that view.

Construction Started on Flour Mill Diesel Plant

CONSTRUCTION of a 700-hp. diesel power plant for the Tennant & Hoyt Milling Company, Lake City Minn., has been started by the Fairbanks-Morse Company; and when completed about Apr. 1, will enable the milling company to generate its own power.

The equipment, to be housed in a separate, new building, will consist of two 350-hp., 14x17-in., 5-cylinder, 300-r.p.m. diesel engines connected to 233-kw., 3-phase, 60-cycle, 2,400-volt alternators; complete cooling tower apparatus; pumping equipment; switchboard; and accessories.

The contract for the sale of this plant was based on the price of power to the amount of 2,500,500 kw.-hr. per year, at 1.15c. per kilowatt-hour, or $28,755. It is estimated that the diesel plant will produce the same energy at a cost not exceeding $18,650 per year, including interest charges on the investment, labor, insurance, maintenance, taxes, fuel and lubricating oil and miscellaneous waste and supplies; thus effecting an annual saving of $10,105 or more, in accordance with price fluctuations on oil and supplies. The mill is in continuous year-round operation, 24 hours daily, and has a normal capacity of 1,300 bbl. of flour per day.

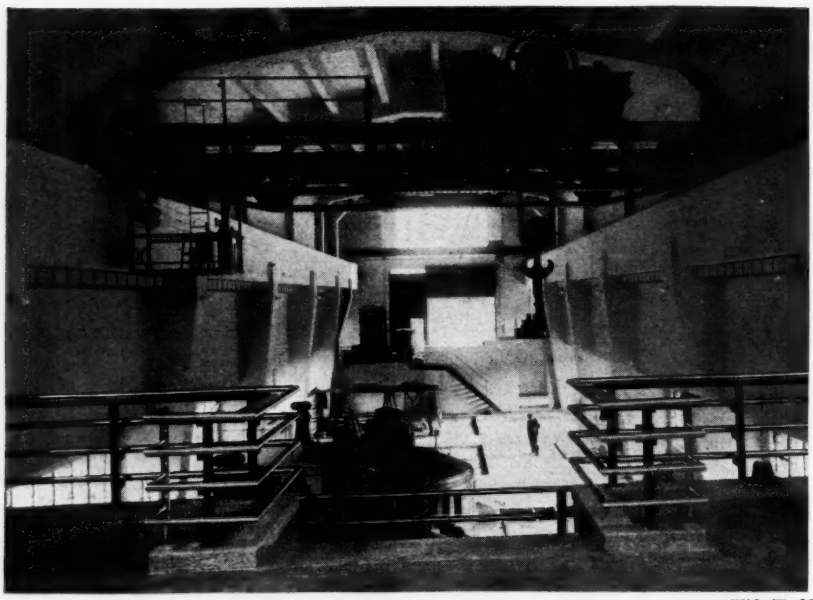
A.I.E.E. Great Lakes District Meeting, Milwaukee, Mar. 14

A MEETING of the Great Lakes District, No. 5, of the American Institute of Electrical Engineers will be held at the New Pfister Hotel, Milwaukee, Wis., on March 14 to 16, inclusive. The program for the meeting includes a well-rounded group of technical sessions, inspection trips and social events.

Three technical sessions will be held, one on each day of the meeting. The first session embraces papers in the fields of electrophysics, research and communication. The second session will be given over to a consideration of the development and design of Waukegan station, together with a discussion of line-wire insulation and insulators. The third session will be devoted to problems in connection with railway electrification and transmission.

Papers to be presented at the technical sessions include: "Development of the Waukegan Station of the Public Service Company of Northern Illinois," J. L. Hecht; "Electrical Design Features of Waukegan Station," E. C. Williams; "115,000-Kw. Turbine-Alternator," R. B. Williamson; "A 60-Cycle Primary Transmission System," C. D. Brown and E. W. Hatz; "The Mercury-Arc Rectifier Applied to A.C. Railway Electrification," O. K. Marti; "Mercury-Arc Rectifier Versus Rotary Converter Automatic Railway Substations," O. M. Ward; "An Improved Type of Limiting Gap for Protecting Station Apparatus," A. O. Austin.

PALESTINE HYDRO PLANT IN SERVICE



Wide World

Palestine recently celebrated the completion of the first stage of its Rutenberg development. Harnessing the waters of the Yarmuk and Jordan Rivers of Biblical fame, this development consists of a 24,000-hp. hydro-electric plant and an elaborate system of storage reservoirs and irrigation works. Two of the francis-type inward-flow turbine-generators are shown installed in the power house, which is unusual for its covered steel work and truss-type crane

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Fifth Coal Conference at Purdue University, Apr. 14-15

THE FIFTH ANNUAL Midwest Bituminous Coal Conference will be held at Purdue University, Lafayette, Ind., on April 14 and 15. This conference is sponsored by Purdue University and the University of Illinois in cooperation with the Coal Trade Association of Indiana, the Illinois Coal Bureau, The Illinois State Geological Survey, the Fuels Division of the American Society of Mechanical Engineers and the Indiana Branch of the American Association of Power Engineers. Four sessions are planned covering industrial, research, retail coal dealers and semi-industrial applications of Midwest coal.

Hoover Portrait Unveiled in Engineering Societies Bldg.

AT THE MEETING of United Engineering Trustees in Engineering Societies Building, New York City, Feb. 15, a large portrait of President Hoover was unveiled. The President sat for this portrait in response to a request from the national engineering societies whose headquarters are in the building. He is an honorary member of each of these four societies of civil, mining and metallurgical, mechanical and electrical engineers, and formerly was president of the American Institute of Mining and Metallurgical Engineers.

The portrait was painted by the internationally known artist, Philip A. de Laszlo, of London. Recently he has painted also a portrait of Mrs. Hoover and portraits of several government officials.

The portrait was delivered by Gano Dunn, chairman of the Hoover Medal Board of Award, representing the four societies, to H. A. Kidder, president of the United Engineering Trustees. The brief ceremony took place before a large group of distinguished engineers from many parts of the country.

1931 Rate Reductions Save $7,400,000 Yearly in N. Y.

THE PUBLIC SERVICE COMMISSION of New York through negotiations with utility companies during 1931 produced reductions in gas and electric rates which will save consumers of the state more than $7,400,000 annually, according to the annual report of the commission submitted to Governor Roosevelt and the Legislature Feb. 15.

In addition to the rate changes which have already become effective, reductions of more than $1,000,000 were nearly concluded at the end of the year, says the report, which adds that the commission is continuing its efforts to reduce rates, and negotiations are under way in several other cases.

The commission has attempted not only to reduce rates, but to simplify rate schedules, to establish uniformity and to eliminate rates which appear to result in unfair discrimination. In one instance, over twenty different rates were combined into one residential and one commercial rate of general application to a large area, thus eliminating not only a multiplicity in one territory, but a multiplicity of rates charged in many territories immediately adjacent.

The commission's report points out that these reductions in rates have been made effective to consumers in various parts of the state and that while the larger savings have been made effective in New York City the efforts of the commission to reduce rates through negotiations with the companies have not been confined to populous centers.

New Course in Engineering Statistics at L. I. University

A NEW COURSE dealing with the applications of statistical methods to engineering and industrial problems is being offered by the Extension Division of the Long Island University, 300 Pearl St., Brooklyn, N. Y. Starting on Feb. 25, the course will run for ten weeks. Sessions will be held each Thursday evening from 6 to 7:30 o'clock. The fee for the course will be twenty dollars.

The course will emphasize the logic, philosophy and applications of probability as applied to engineering work. Since little attempt will be made to develop the various mathematical formulas used, an elementary knowledge of calculus will be a sufficient prerequisite. Specific applications of statistical methods to research, design work, development and production, inspection, structural problems and purchasing will be covered in the lectures.

Power Output by Fuels and Water 3 and 7% Less in 1931

PRELIMINARY FIGURES of the total production of electricity for public use in the United States in 1931 indicate an output of 91,679,000,000 kw.-hr., a decrease of 4 per cent from the output in 1930, the Geological Survey of the Department of the Interior announced in a statement issued Feb. 16.

Production of electricity by the use of water power in 1931 was about 7 per cent less than in 1930 which, in turn, was about 5 per cent less than in 1929. These decreases in the production of electricity by the use of water power were due primarily to the deficiency in precipitation during 1930 and 1931 which decreased the flow of streams utilized for water power.

The production of electricity by the use of fuels in 1931 was about 3 per cent less than in 1930. The consumption of fuel, however, was 7 per cent less. The average quantity of coal consumed in generating one kilowatt-hour in 1931 was about 1.55 lb. This is less than half the average for 1919. The conservation of fuel brought about by the operators of public-utility power plants in the twelve years from 1920 to

1931 by better utilization of fuel in the generation of electricity was 325,000,000 tons, which represents a saving of over a billion dollars in expenditures for fuel.

The use of coal and oil for fuel in steam power plants in 1931 as compared with 1930 showed a decrease of 10 and 13 per cent respectively. The use of natural gas increased 15 per cent. In the South Atlantic States there was an increase from 94,000,000 to 1,300,000,000 cu.ft., a gain of 1,300 per cent. Most of the increase was at a reserve steam plant which was operated for a few months during low water. The gain in the use of gas in the East North Central States was 30 per cent, Mountain States 49 per cent, and the Pacific States 72 per cent.

N.A.P.E. Joins Advisory Group on Committee of Ten

THE National Association of Power Engineers has accepted the invitation to affiliate with the Committee of Ten of the Coal and Heating Industries in the capacity of an advisory member, it was announced recently by the committee. Olaf Jacobson, of Chicago, Ill., has been designated as the representative of the association on the committee. The alternate representative has not yet been selected.

Air Conditioning Topic of Case School Conference

AIR CONDITIONING will be the subject for the third industrial conference sponsored by the Case School of Applied Science at Cleveland, Ohio. To be held on March 17 to 19, the conference in effect will be a three-day course in the fundamentals of both home and industrial air conditioning. According to the tentative program arranged by the committee in charge, of which Professor G. L. Tuve is chairman, the conference will cover the principles of air conditioning, unit processes, features in the design of equipment, industrial applications and requirements for human comfort.

Under these five general headings many specific phases of the subject will be discussed. The use of psychrometric charts, calculation of heat requirements and such new developments as the reversed refrigeration cycle will be covered. A comparison will be made of dehumidification by refrigeration, by calcium chloride and by silica gel. Air pollution and its relation to air conditioning will be considered, along with the selection of heat-transfer units for heating and cooling air.

Methods of air distribution, applications of instruments and control devices and the relation of air conditioning to building construction and specific industries will be studied.

How's Business?

NEW emergency banking legislation has stimulated speculative activity in security and commodity markets by arousing renewed expectation of a final check to deflationary forces, but business activity has so far shown no sign of response. Most current indicators moved to lower levels by the middle of February. Building contracts have practically dried up with the disappearance of public construction. Electric power output (1,578,817,000 kw.-hr. for the week ended Feb. 13, according to the N.E.L.A.) is depressed by unseasonal weather. Carloadings continue slack except for sporadic spurts of coal shipments. Steel production still awaits acceleration from automobile demand. Foreign trade has relapsed to pre-war levels, and prospects for progress in international cooperation on reparations and peace problems are not improved. — *The Business Week*, Feb. 24.

COMING CONVENTIONS

American Society of Mechanical Engineers. Spring meeting at Bigwin Inn, Lake of Bays, Ont., Canada, June 27-July 1. Oil and Gas Power meeting at Pennsylvania State College, June 8-11. Secretary, Calvin W. Rice, 33 West 39th St., New York City.

American Institute of Electrical Engineers. District meetings at Milwaukee, Wis., March 14-16, and Providence, R. I., May 4-7. Annual summer convention at Cleveland, Ohio, June 20-24. Secretary, F. L. Hutchinson, 33 West 39th St., New York.

American Boiler Manufacturers Association. Annual convention at the Greenbrier Hotel, White Sulphur Springs, W. Va., May 23-25. Secretary, A. C. Baker, 801 Rockfeller Building, Cleveland, Ohio.

American Society for Testing Materials. Committees group meetings in Cleveland, Ohio, March 7-11. Annual meeting at Chalfonte-Haddon Hall, Atlantic City, N. J., June 20-24. Secretary, C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

American Water Works Association. Annual convention at the Hotel Peabody, Memphis, Tenn., May 2-6. Secretary, Beekman C. Little, 29 West 39th St., New York City.

American Welding Society. Annual meeting in New York City, Apr. 27-29. Secretary, M. M. Kelly, 33 West 39th St., New York City.

Association of Iron and Steel Electrical Engineers. Annual convention in Pittsburgh, Pa., June 20-24. Managing Director, John F. Kelly, Empire Building, Pittsburgh.

National District Heating Association. Annual convention at the William Penn Hotel, Pittsburgh, Pa., June 14-17. Secretary, D. L. Gaskill, Greenville, Ohio.

National Electric Light Association. Annual convention in the Atlantic City Auditorium and Convention Hall, Atlantic City, N. J., June 6-10. Secretary, A. Jackson Marshall, 420 Lexington Ave., New York City.

16 Research Assistantships Open at Univ. of Illinois

APPLICATION for appointments to the sixteen research graduate assistantships maintained at the Engineering Experiment Station of the University of Ilinois at Urbana are due on April 1, according to a recent announcement of the director of the station. These assistantships, for each of which there is an annual stipend of $600 and freedom from all fees except matriculation and diploma fees, are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics, or applied chemistry.

An appointment to the position of research graduate assistant is made and must be accepted for two consecutive collegiate years of ten months each, at the expiration of which period, if all requirements have been met, the degree of master of science will be conferred. Half of the time of a research graduate assistant (approximately 900 clock hours for each ten-month period) is required in connection with the work of the department to which he is assigned, the remainder being available for graduate study. Research work and graduate study may be undertaken in all important branches of engineering and science.

Highest-Voltage Submarine Cable for Ariel Power

THE HIGHEST-VOLTAGE submarine cable crossing in the world, rated at 115,000 volts, is to be installed beneath the Columbia River and the Oregon Slough so that power can be transmitted directly to Portland, Ore., from the new Ariel hydro-electric plant on the Lewis River, Wash. The installation also will mark the first use of oil-filled cable for a submarine crossing.

The cable crossing will be from Vancouver to Hayden Island, and from there to the Portland shore of the Oregon Slough. Across Hayden Island there will be overhead transmission. Under the Columbia River there will be three 3,700-ft. lengths of the cable, buried beneath 6 ft. of the river bottom, and beneath the Slough there will be three 1,515-ft. lengths, likewise buried.

Supplied by the General Electric Company, the cable will have a spiral hollow core, around which will be stranded three layers of copper wire, making a total conductor cross section of 750,000 circular mils. The insulation will be special wood pulp paper impregnated with an oil somewhat more viscous than transformer oil. The lead sheath will contain 2 per cent of tin to give it strength against the internal oil pressure. The usual asphalted jute covering will serve as a cushion for approximately 42 hard-drawn copper armor wires.

NEW PLANT CONSTRUCTION

COMPILED BY THE McGRAW-HILL BUSINESS NEWS DEPARTMENT, WHICH IS PREPARED TO FURNISH A MORE COMPLETE DAILY SERVICE TO THOSE WHO WISH IT

Calif., Mare Island (sta. Vallejo)—Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded contract for construction of battery overhaul building, sub-station and acid mixing plant at Navy Yard, Submarine Repair Base here to Bartlett & Hilp, 918 Harrison St., San Francisco. $145,000.

Calif., Sunnyvale—Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded contract for construction of a group of buildings including boiler plant, helium storage building, etc., at Naval Air Station here to Robert E. McKee, Los Angeles. $64,300.

Conn., New London—Alfred Mitchel Woods Associates Inc., c/o Payne & Keefe, 231 State St., Archts., awarded contract for a 2 story, 35 x 90 ft. field house including 22 x 25 ft. porch, garage, work shop and boiler room to Oliver Woodworth Co., 36 Pearl St. Estimated cost $25,000.

Ill., Springfield—City plans improvements to municipal power plant. Burns & McDonnell Engineering Co., 401 Interstate Bldg., Kansas City, Mo., is engineer.

Ind., Garrett—City will soon award contract for addition to municipal water and light plant including equipment. Estimated cost $40,000. A. M. Strauss, 415 Cal-Wayne Bldg., Fort Wayne, is engineer.

Kan., Kansas City — Kansas City Power & Light Co., 14th St. and Baltimore Ave., having plans prepared for construction of a 1 story sub-station building at 42nd St. and Myrtle Ave. Estimated cost $50,000. H. G. Freshman is company architect.

Kan., Larned — City is having preliminary plans prepared for improvements to municipal waterworks including two deep wells, pumps, main extensions, etc. Charles A. Haskins, 824 Finance Bldg., Kansas City, Mo., is engineer. Maturity indefinite.

Mass., Dudley—A. W. McKinstrey, Webster, will build 1 story ice plant on West Main St. here. Estimated cost $40,000. Private plans. Work will be done by day labor.

Mass., Holyoke—Holyoke Ice Co., W. T. Wilson, Treas., 65 Prospect St., receiving bids for construction of a 1 story, 60 x 120 ft. ice manufacturing plant at Walnut and Prospect Sts. Estimated cost $40,000. R. E. Palmer, 56 Suffolk St., is architect.

Mass., Northampton—Norwood Ice Co., A. A. Grant, Merrick Lane, having plans prepared for addition to artificial ice plant on Easthampton Road. Estimated cost $40,000. R. E. Palmer, 56 Suffolk St., Holyoke, is engineer.

Mass., Squantum—Commonwealth of Massachusetts, Metropolitan District Commission, 20 Somerset St., Boston, will receive bids until February 25 for construction of a 1 story, 28 x 35 ft. sewage pumping station. Estimated cost $25,000. Private plans.

Mich., Detroit—U. S. Treasury Department, Office of Supervising Architect, Washington, D. C., will receive bids until March 14 for construction of boiler house, also removal of detention quarters here.

Miss., Biloxi—U. S. Veterans Administration, Arlington Bldg., Washington, D. C., awarded contract for group of hospital buildings at Veterans Administration Home here to National Construction Co., Tower Bldg., Washington, D. C., $531,932; nurses' and officers' quarters, etc., to Rogers & Leventhal, Inc., 822 East 11th St., Chattanooga, Tenn., $108,025. Mechanical work not yet awarded.

Mo., DeSoto—City Council has called off proposed election set for February 23 for $95,000 bonds for construction of municipal light and power plant.

Mo., St. Louis — Kroger Grocery & Baking Co., A. S. Grogg, Gen. Mgr., 3801 Vista Ave., St. Louis, and 35 East 7th St., Cincinnati, O., will receive bids until February 29 (to be opened in Cincinnati) for construction of a 4 story, 85 x 190 ft. bakery, including garage, boiler room, salvage room, also extensive alterations to existing building, including loading dock, etc., at 1311 South 39th St. Estimated cost $700,000. Emil E. Niemann, 3816 Shaw Ave., St. Louis, is architect.

Neb., Schuyler—City awarded contract for 750 kw. turbo generator and switchboard to General Electric Co., 610 Electric Bldg., Omaha, condenser and miscellaneous equipment to Elliott Co., 724 Union State Bank Bldg., Omaha, superheaters to Foster Wheeler Corp., 20 North Wacker Dr., Chicago, Ill., and steam flow meter to Bailey Meter Co., 407 Coca Cola Bldg., Kansas City, Mo. Total cost $28,762.

N. J., Trenton—Belmar Commissioners, plan to expend $12,000 for new mains and pumps for water system.

N. Y., West Point — Constructing Quartermaster, having plans prepared for construction of gas wroks at Military Academy grounds. Estimated cost $200,000. Private plans. Maturity indefinite.

Pa., Sharpsburg—Veterans Administration, Arlington Bldg., will receive bids until March 1 for constructing and finishing complete addition to infirmary building including heating and ventilating, electrical work, etc., at Veterans Administration Hospital, Aspinwall, Sharpsburg.

Tex., Sherman—Independent Ice Co., Sherman, c/o A. C. Beckner, Wolfe City, having plans prepared for construction of a 20 ton electrically operated ice plant here. Estimated cost $32,000. Private plans.

Va., Bedford—City, W. C. Ballard, Mgr., plans waterworks improvements including installation of new lines and booster pump, increasing capacity of reservoir and extending mains, etc. Estimated total cost $22,000. Work will be done by owner's forces. Contract awarded for 750 g.p.m. motor driven pump to Ingersoll-Rand Co., 11 Broadway, New York, N. Y.

Wis., Campbellsport—City, A. W. Guenther, Clk., having plans prepared for construction of a complete waterworks system including pumping equipment, etc. Estimated cost $15,000. Paul L. Clark, 207 College Ave., Appleton, is engineer.

Ont., Burlington — Town, J. Hobson, Clk., plans construction of a new waterworks pump house, etc.

Equipment Wanted

Boilers, Stokers, Pumps, etc. — Milwaukee, Wis. — Ottomar H. Henschel, 401 Commerce Bldg., Consult. Engr., receiving bids for boilers, stokers, pumps, steam flow meters, turbines, fittings, etc., for proposed new boiler plant for Federal Pressed Steel Corp., 50 Keefe Ave.

Engine—Oklahoma City, Okla.—City, John L. Pruis, Engr., plans to purchase a 400 hp. gas, gasoline or Diesel oil engine for waterworks pumping plant.

Pump—Chatham, N. J.—Borough Council, Charles Prager, Clk., will receive bids until March 7 for a deep well pump and appurtenances in connection with proposed pump house.

Pump—Sugar City, Idaho—City plans to purchase and install a deep well turbine pump for waterworks system.

Pumping Equipment—Boston, Mass.—Department of Public Works, City Hall, will receive bids until March 1 for pumping equipment for Horn Pond pumping station.

Refrigeration Equipment—Central Islip, N. Y.—Department of Mental Hygiene, State Office Bldg., Albany, will receive bids until March 9 for refrigeration equipment at Central Islip State Hospital here.

Power Plant Equipment—Earth, Tex.—City is receiving bids for machinery and equipment for proposed electric power plant. Address J. M. Barlow.

Sub-Station Equipment—Washington, D. C.—David Lynn, Archt. for Capitol, Capitol Bldg., will receive bids until March 10 for furnishing and installing electric sub-station equipment in new House of Representative office building.

Transformers—City plans installation of transformers for municipal power plant. $20,000.

Industrial Projects

Ark., Forrest City—Forrest City Cotton Oil Mill, Phillip Hickey, Mgr., awarded contract for construction of a cotton oil mill including four mill buildings, 90 x 200 ft. seed warehouse, 60 x 60 ft. cleaning room, two unloading sheds each 18 x 100 ft., etc., to John A. Moore and Muskogee Steel Co., Muskogee, Okla. Estimated cost $50,000.

Calif., Los Angeles—Wood Hydraulic Hoist & Body Co., 1210 Mateo St., awarded contract for a 1 story, 200 x 230 ft. factory at 28th and Santa Fe Sts., to M. P. Wilkinson, Hollywood Security Bldg. $45,000.

Mich., River Rouge—Ford Motor Co., Schafer Road, Dearborn, awarded contract for construction of two electric substations, one for steel mill and one for glass plant here to Butts Construction Co., 6500 Epworth Blvd., Detroit. Estimated cost $50,000.

Mo., St. Louis — Binz Hide & Tallow Co., DeKalb and Zepp Sts., receiving bids for a 1 and 2 story, 32 x 106 ft. addition to plant. Estimated cost $40,000. Charles L. Krause, 3944 Evans Ave., is architect.

N. J., East Rutherford — J. T. Camlet, 26 Piaget Ave., Clifton, Archt., will receive bids about April 15 for construction of a 2 story syringe manufacturing plant at 54 Mozart St. for East Rutherford Syringe Co., 75 Mozart St. Estimated cost $50,000.

N. J., New Brunswick—Edison Cement Corp., 261 Fifth Ave., New York, N. Y., plans remodeling plant of Building Materials Corp. and constructing cement manufacturing plant at Meadows Road, Raritan township, here. Estimated cost $500,000.

N. J., Newark—Unique Arts Mfg. Co., 196 Waverly Ave., having revised preliminary plans prepared for construction of a 2 story factory. Estimated cost $75,000. Saul Shaw & Co., 24 Commerce St., are architects and engineers.

Pa., Franklin—Venango Mfg. Co., First and Liberty Sts., Franklin, subsidiary of Franklin Railway Supply Co., 60 East 42nd St., New York, N. Y., receiving preliminary bids for construction of a 1 story, 260 x 300 ft. and 200 x 260 ft. manufacturing and assembly plant here. Estimated cost $750,000. Milton Hefferman, First and Liberty Sts., Franklin, is plant engineer.

Tenn., Chattanooga—Peerless Woolen Mills, Rossville, Georgia, plans a 3 or 4 story, 100 x 300 ft. warehouse and processing plant here. Estimated cost $100,000. Architect and engineer not selected.

Va., Alexandria — Ford Motor Co., 3674 Schafer Road, Dearborn, Mich., taking bids for construction of a 1 story, 200 x 400 ft. assembly plant and distribution and service building here. Estimated cost $100,000. Albert Kahn, 1001 Marquette Bldg., Detroit, is architect.

W. Va., Chester—E. C. Otis Mfg. Co., Toronto, Ont., plans construction of a 1 story, 50 x 184 ft. factory here, for the manufacture of built-up roofing and buildnig paper. Site acquired. Estimated cost $60,000. Private plans.

Wis., Rice Lake — Rice Lake Cheese Box & Manufacturing Co., c/o Frank Ruttner, plans to rebuild box factory recently destroyed by fire. Estimated cost $40,000.

Ont., Toronto—McQuay-Norris Mfg. Co., William K. Norris, Pres., 2320 Cooper St., St. Louis, Mo., acquired a site and plans addition to piston ring plant here. Estimated cost $1,500,000. Maturity indefinite.